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CHEMICAL INDUSTRIES

The Chemical Industries Magazine


PAN AMERICAN
AIRWAYS SYSTEM

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akers & Users of Chemicals

Management, Research,
Production, Marketing

CHEMICAL INDUSTRIES

Contents

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MAY, 1943

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BETWEEN THE LINES

Rubber's Influence on Post-War Alcohol Industry

Discussion of the feasibility of using various materials to make alcohol leads to a number of corollary considerations. One is, how much alcohol do we need? Not only for war purposes, but for after the war.

The usual answer to such questions now is to point to the synthetic rubber program, fostered by the United States government. But is the country going to have a synthetic rubber industry after the war? On the answer to that query would seem to depend such decisions as would be involved in exploration of new alcohol processes, and whether facilities using these processes will have permanent value.

IF the American public is to ride on synthetic rubber predominantly after the war, the fact is important to the alcohol industry now being expanded for war needs. The enlarged facilities, and any post-war surplus of alcohol left from current production need not then be written off as a passing phase of the war effort. If tires are to be made for the most part, of imported natural rubber, as in pre-war times, another aspect of the matter becomes obvious.

An active controversy over this issue is raging officially at this writing. It is summed up in the questions raised in Congress, and between opposing factions among Federal agencies:

Is the Federal government investing millions, perhaps billions of its taxpayers' money in foreign countries, to develop a new natural rubber supply, only to drop it when the emergency passes?

Or will the country insist that having made a start with synthetic rubber, this industry be allowed to grow?

If the latter is to be the case, who will operate this industry, private enterprise, or government?

Rubber Production Administrator William M. Jeffers heads those who advocate a synthetic rubber industry on a large scale after the war. A cogent argument, not by Jeffers, but others, including some in official life, is that the country should make itself forever independent of foreign sources of rubber henceforth. There is talk that foreign natural rubber monopolies, just before the war, blocked purchases by the United States which would have assured this country of an adequate stockpile of raw rubber for its present emergency needs.

On the other side, it is becoming evident that a plan is more than half-formed to build new trade, and international relationships, around imported rubber—from new sources as well as old, if the latter are again available. At the most, this plan would aim to merely bolster raw rubber supplies with additions of synthetic rubber.

Without attempting to answer these questions or cite more arguments, it is possible at this stage to furnish considerable background on which independent conclusions can be based, subject to later evolution.

First, synthetic rubber is a fact. How much of it is available in this country, or will be, and when, are other questions, but it is here.

Dr. Lyman J. Briggs, director of the U. S. Bureau of Standards, which has conducted comparative tests recently told a Congressional committee;

"I am satisfied from the experiments to date that we have nothing to fear regarding this synthetic rubber as to quality. I think it is going to equal our natural rubber."

Synthetic vs. Natural

From a competitive standpoint there is the important fact that synthetic rubber costs about 15 cents more per pound than the raw product. It is not clear whether this increase refers to the price now being paid Latin American countries for their raw rubber, which is approximately 20 cents per pound. If this is the case, a further competitive angle is apparent in the allegation by Congressmen, and others, that this South American raw rubber can be sold to us at 10 cents, and still leave the sellers a profit.

Whether synthetic rubber can compete with a natural commodity produced by native labor probably will not be known until the end of the war, and it is then seen if mass production of the synthetic article has the usual effect on the price. In this respect, however, regardless of price, it is practically assured that a fairly large production of synthetic elastomers will remain after the war because of their superior qualities for specific applications.

The outlook for natural rubber has an obvious bearing upon the future prospects of the synthetic rubber industry, thus seemingly well-launched. For various reasons not so much is heard of developments in raw rubber production. Nevertheless, the United States government, through other agencies than those primarily interested in the synthetic product, is equally active in exploring and bringing to utility, new sources of natural rubber.

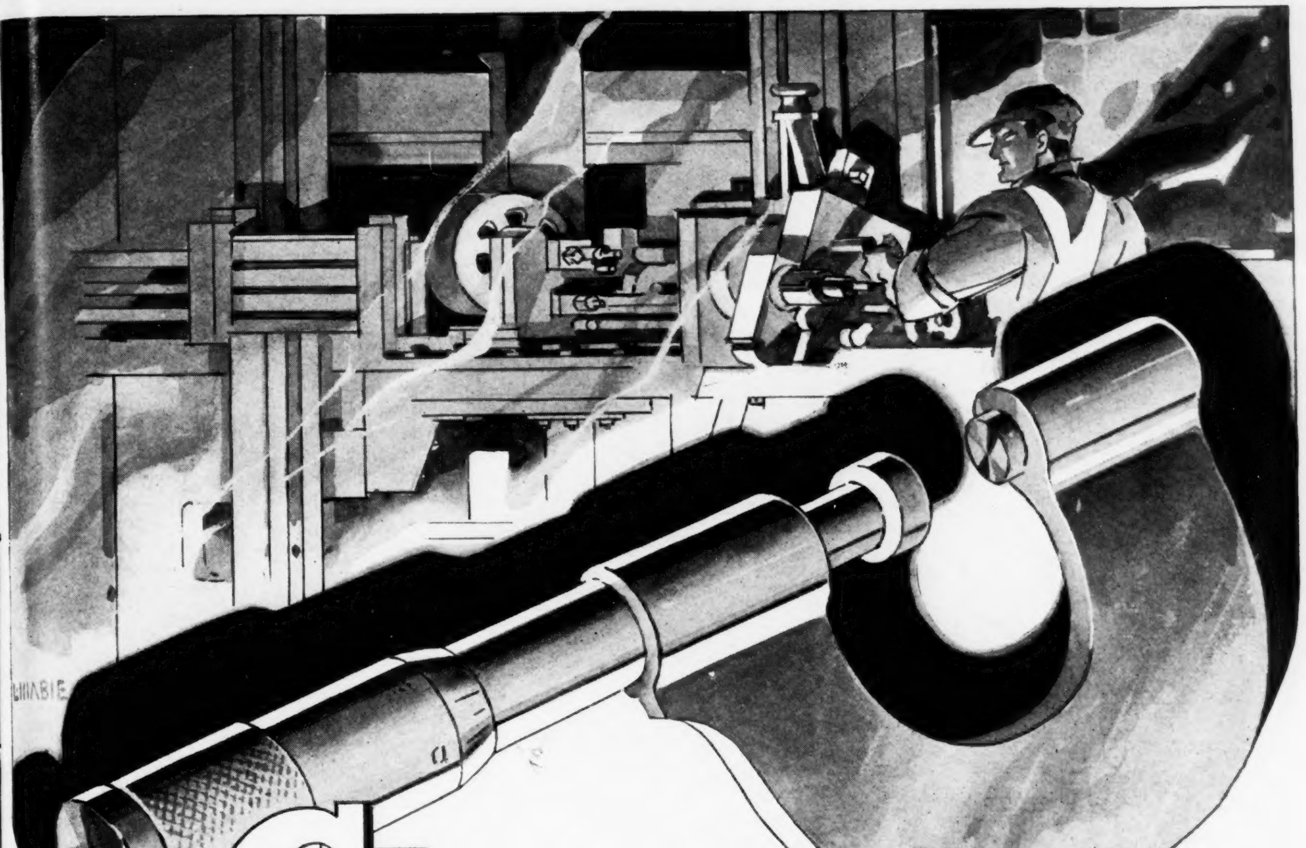
To date this has been all wild rubber. From all Latin American countries the total imported in 1941 amounted to 20,500 long tons, of which Brazil is credited with 14,000 tons, and exclusive of 5,300 tons of wild guayule from Mexico. Imports in 1942 from the same countries are estimated at 30,500 long tons, exclusive of wild guayule.

Virtually unknown to most people in the United States, American officials interested in fostering new raw rubber supplies, and perhaps building new trade programs around them, are embarked on an ambitious plan of development of Latin American rubber plantations, comparable to those that existed under the British and Dutch in Malaya.

Countries in the South American rubber zone in the Amazon basin, have allocated substantial acreage for such plantations, are supplying the necessary local labor, and some reports indicate, a certain amount of money. These plantations, it should be emphasized are unrelated to present efforts to tap wild rubber supplies. They are part of a plan for future supplies of cultivated rubber, as distinguished from the wild variety.

Even here many obstacles have been found. American technical experts are now trying to eradicate a type of leaf blight that in the past, ruined efforts of the countries there to become rubber producers on a commercial scale. Progress is being made, but the success of the plantation plan hinges on this fight. In any event it will be 5 to 7 years before substantial cultivated rubber stocks will be available from this source, assuming the program is carried forward.

Here then, are two completely different approaches to the problem of more rubber—one of them the natural evolution of American industries into the new field of synthetic rubber, and the other a pioneering effort in another continent to develop potential sources of new raw rubber. Fundamentally the two programs are inimical, though not necessarily so in the long view. It is traditional in this country however, to protect a native industry, and it is entirely conceivable on this ground that rubber from foreign plantations might be handicapped in competition with a successful synthetic product of American factories and American labor. Time will have to settle this situation.



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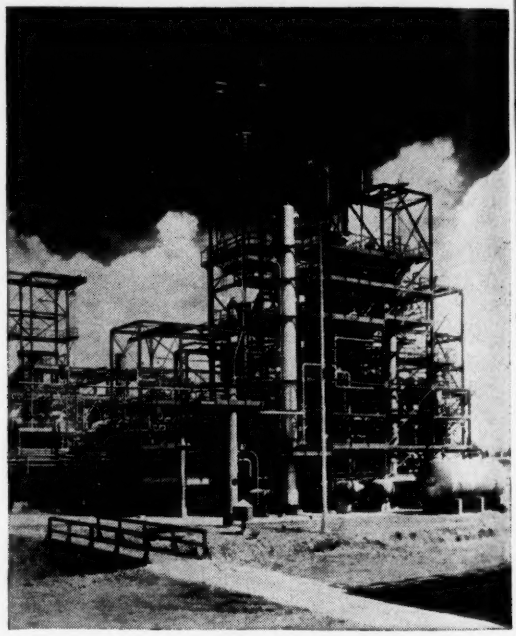

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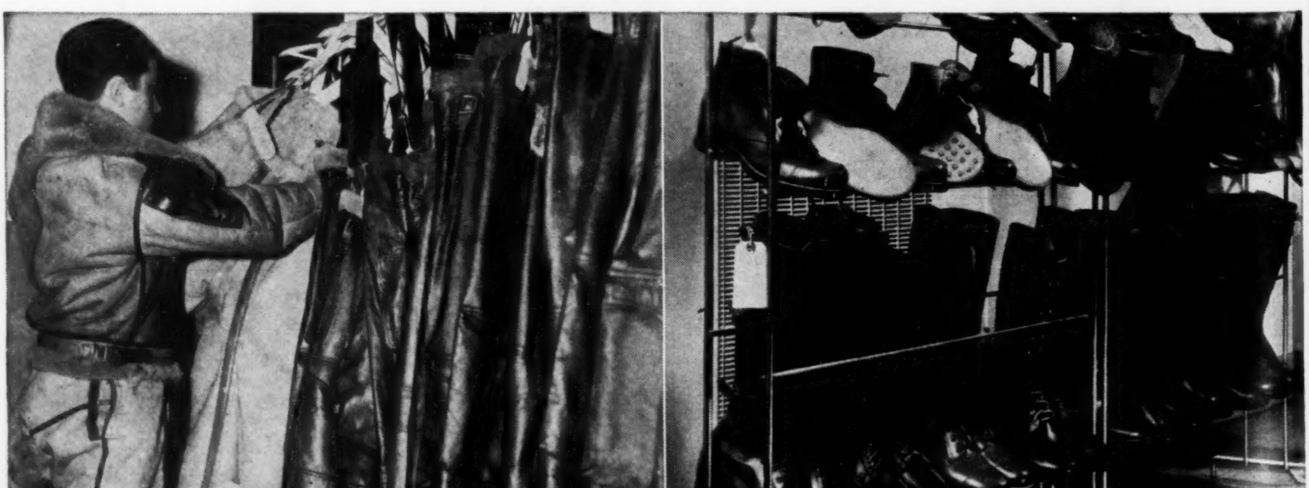

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WASHINGTON

By T. N. Sandifer

Alcohol Appraisal

WAR production requirements are currently in the second-look, or perhaps it can be called the second-guess stage. During the early part of the war it was a common practice of the armed services and government program planners to call for everything in sight. The theory was that is was better to be on the safe side—if needed, the stuff would be on hand.

T. N. Sandifer

More practical or less excited counsel from the industries concerned was overridden. Now, well into the second war year, there is a tendency to look again. Cut-backs are taking place in some fields, including chemicals, as a result. The trend may become more pronounced as the year wears on. There are confusing elements and uncertainties in the situation, but this is the outlook.

In the case of industrial alcohol production, the decision by the Chemical Division of WPB to hold output to present indicated levels is not exactly a second-guess. The decision represents, more properly speaking, a return to the original position of the division. Its former heads, when it was a branch in the WPB organization, moved very reluctantly into an expanded production program, and some of them were not immediately convinced of an insufficient supply.

On the basis of the present outlook however, some interesting developments may follow. The Chemical Division has under consideration a modification of restrictions on alcohol in the M-30 Order. It is expected that ethyl alcohol may be in much freer supply for anti-freeze manufacture, and some further relaxations may be in prospect.

The change in the industrial alcohol production program is due partly to reduced Army requirements, which in turn is attributed to improved efficiency at ordnance plants in the use of alcohol, and to alterations in the Army's plans which cannot be detailed here. It is also due in equal measure to a revision by the Chemical Division in its estimates of what the synthetic rubber program will require.

There are some uncertain features in this picture, however. The division reached its estimate of the rubber program requirements in alcohol, from all indications, independently of the director of rubber production, William Jeffers. It is known that he did not agree with division heads on this point. Moreover, the division's estimate of projected alcohol needs was not based on a reduction in synthetic rubber manufacture. In substance, the division explained that it had previously carried a safety margin over what it believed would be actually needed, and was now curtailing this safety factor in the light of current developments.

Without going too deeply into involved statistics, the Chemical Division initially used the highest figure received from either Mr. Jeffers' office, or the Office of the Rubber Reserve Corporation (Mr. Jones, Secretary of Commerce).

For 1943 the original estimates furnished by these agencies ranged from 145 million gallons to 200 million, the latter estimate being attributed to Rubber Reserve. This is now held at the lower figure. For 1945 the earlier figure ranged between 590 million and 640 million gallons, and is now held at the lower figure. A tolerance of 10 percent either up or down was allowed in these estimates by the division.

Mr. Jeffers' optimism on the number of tires to be available, and when, has not been shared altogether by certain others in Washington, as indicated by the flat contradiction issued officially by the Office of War Information (Elmer Davis) not long ago. It may well be that Chemical Division also appraised the Rubber Program's alcohol needs in the same light.

Production this year has been running ahead of advance estimates. Early production estimates were 490 million gallons in 1943, which is now cut back to 470 million, since certain construction projects will not be pushed as rapidly as originally planned. In 1944, alcohol production is estimated at 530 million gallons, not including any from new plants.

A summary of the new plant situation shows plans approved for 3 in December, which will not be completed for some time; 5 for which sites were selected and operational bids invited, but which were scratched for the time being, recently; and 12 expansion projects approved and in various stages of construction. East Coast plants have not completed converting operations to grain from molasses, but will, in the next few months. Meanwhile these are not operating at capacity.

Regarding plant construction, it is not generally known that the deferment on five new plants has still to get by the final authority. While the Chemical Division's action apparently was assured of formal approval, the requirements report which will cover this action has not, at this writing, been submitted to the appropriate committee of WPB.

Mr. Jeffers represents an important element of civilian supply—auto tires, or the hope for them—so can be sure of a hearing before the issue is settled. He was able, last winter, to get priority for rubber production apparatus, to the disgruntlement of the armed services. Whether his expectations on tires for everybody, soon, is realistic or not, he stands to benefit by the general trend toward more consideration of civilian needs. Accordingly, the alcohol production situation could be altered.

Parenthetically, the present stockpile is largely grain alcohol, grain consumption for this purpose being set down at 135 million bushels this year and 190 million in 1944. Alcohol production estimates must allow for availability of grain, or a change in molasses shipments.

In appraising the industrial alcohol situation, and the related controversies over synthetic rubber manufacture and octane gas requirements, as well as others widely publicized, civilian supply aspects should be given careful consideration. New emphasis is being placed on civilian requirements in all fields. This is a complete reversal of Washington procedure of the past year or more, but it is very evident.

Civilian Requirements Gaining

Joseph Weiner, former chief of the Civilian Supply division in WPB, and author of the much-discussed "bed-rock"

(*Continued on page 650*)

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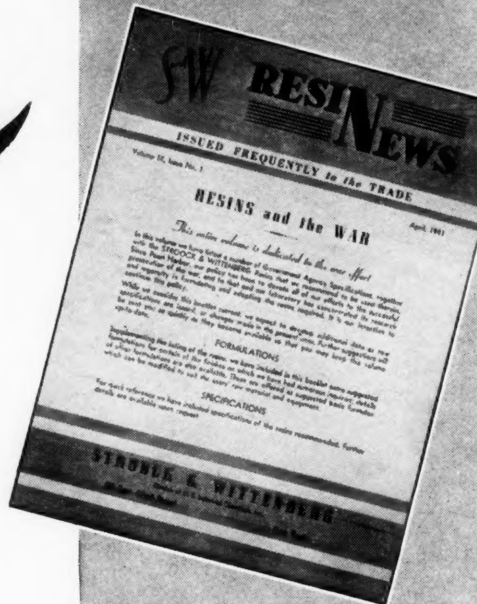
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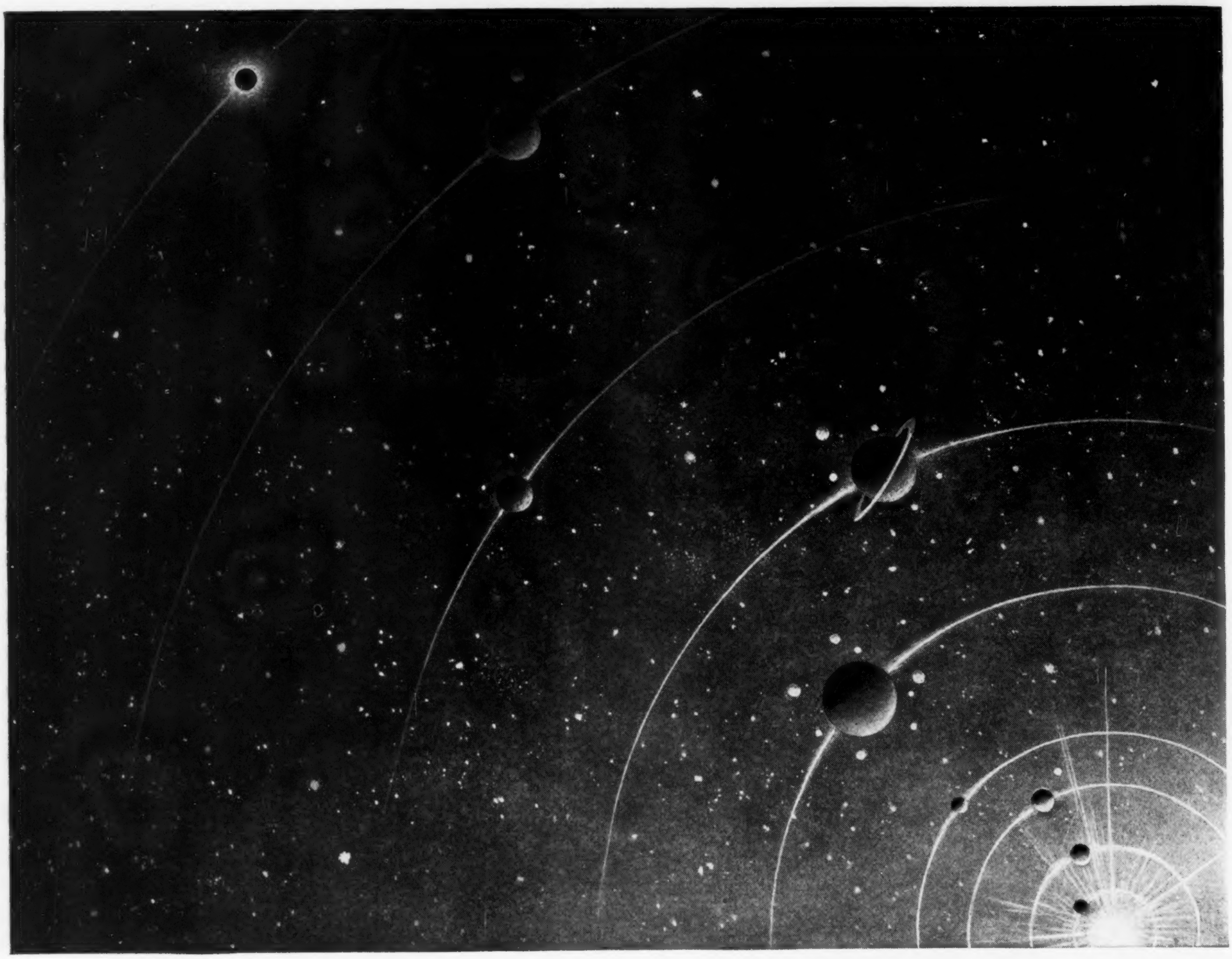

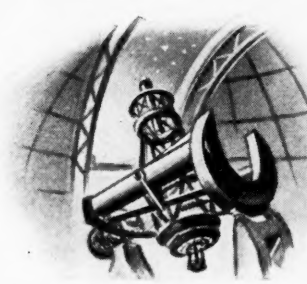


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$$\underset{\text{2-nitro-1-butanol}}{CH_3CH_2CHNO_2CH_2OH} + CH_3COOH \longrightarrow \underset{\text{2-nitro butyl acetate}}{CH_3CH_2CHNO_2CH_2OOCCH_3\,(I)} + H_2O$$

$$2(I) + Na_2CO_3 \longrightarrow \underset{\text{2-nitro-1-butene}}{2CH_3CH_2CNO_2{=}CH_2} + 2NaOOCCH_3 + CO_2 + H_2O$$

Methazonic Acid is obtained from Nitromethane treated with strong alkali:

$$2CH_3NO_2 + NaOH \longrightarrow \underset{\text{Sodium methazonate}}{\underset{\overset{\|}{NOH}}{CH}CH{=}\overset{\nearrow O}{N}\text{-}ONa\ (I)} + 2H_2O$$

$$(I) + H_2O \longrightarrow \underset{\text{Methazonic acid}}{\underset{\overset{\|}{NOH}}{CH}CH{=}\overset{\nearrow O}{N}\text{-}OH} + NaOH$$

Further treatment of methazonic acid with strong alkali produces the corresponding salt of nitro acetic acid:

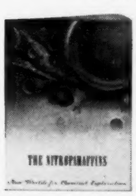
$$\underset{\overset{\|}{NOH}}{CH}CH{=}\overset{\nearrow O}{N}\text{-}OH + NaOH \longrightarrow \underset{\text{Sodium nitro acetate}}{NaOOCCH_2NO_2} + NH_3$$

The Nitroparaffin derivative Hydroxylamine* reacted with diacetylmonoxime gives the important analytical reagent, Dimethylglyoxime:

$$\underset{\text{methyl ethyl ketone}}{CH_3COC_2H_5} + HNO_2 \longrightarrow \underset{\text{Diacetylmonoxime}}{\begin{matrix} CH_3C{=}NOH\ (I) \\ | \\ CH_3C{=}O \end{matrix}} + H_2O$$

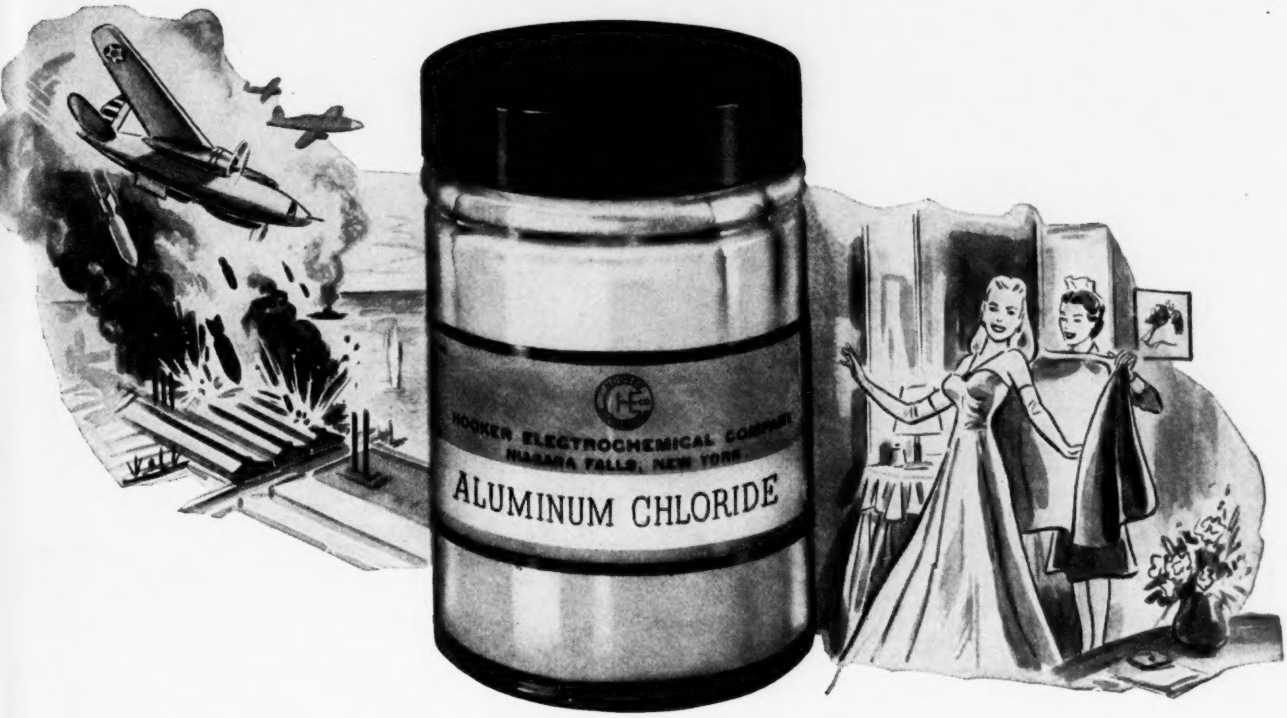
$$(I) + NH_2OH \longrightarrow \underset{\text{Dimethylglyoxime}}{\begin{matrix} CH_3C{=}NOH \\ | \\ CH_3C{=}NOH \end{matrix}} + H_2O$$

*Supplied in the form of its salts—the sulfate, acid sulfate, and chloride.



The versatility of the Nitroparaffins is indicated by the foregoing reactions taken from the technical and patent literature. For more complete information write for a copy of "The Nitroparaffins—New Worlds for Chemical Exploration."

Busy Chemicals for the War and After



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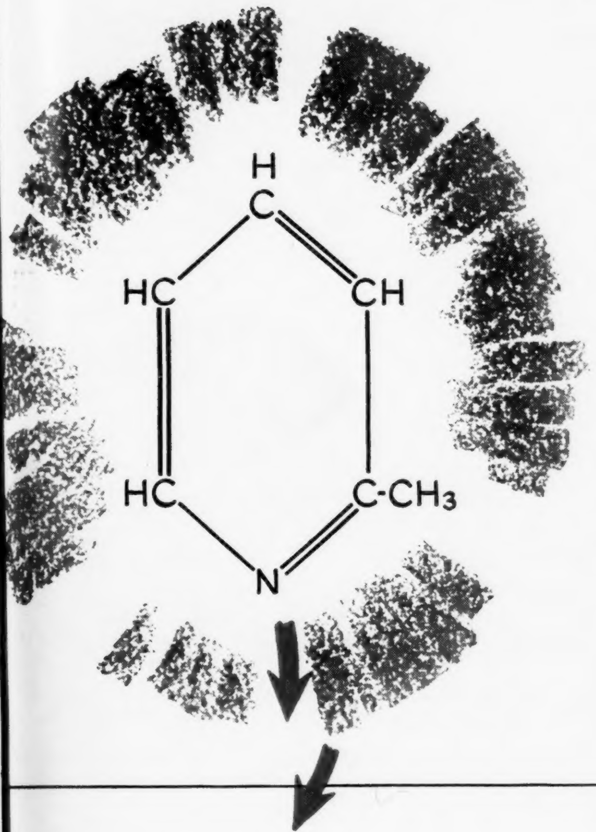

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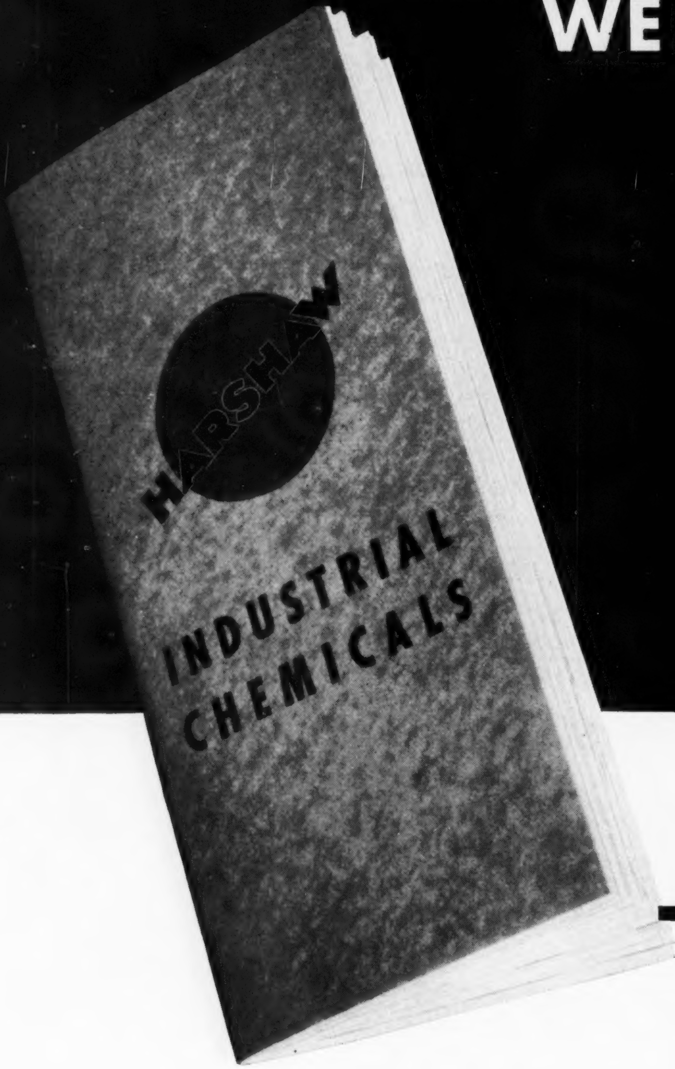

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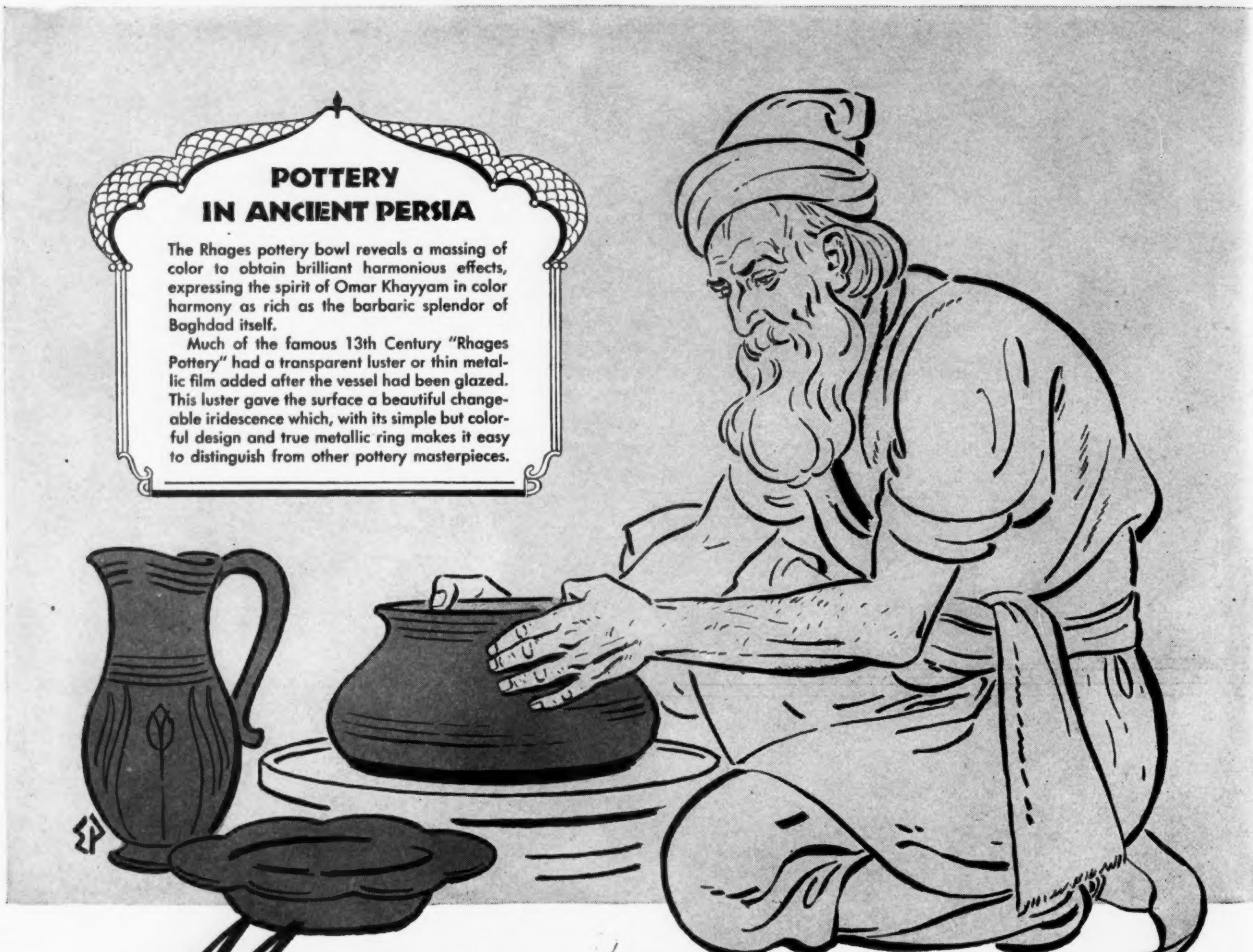

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FIG. 55
CONDENSATION
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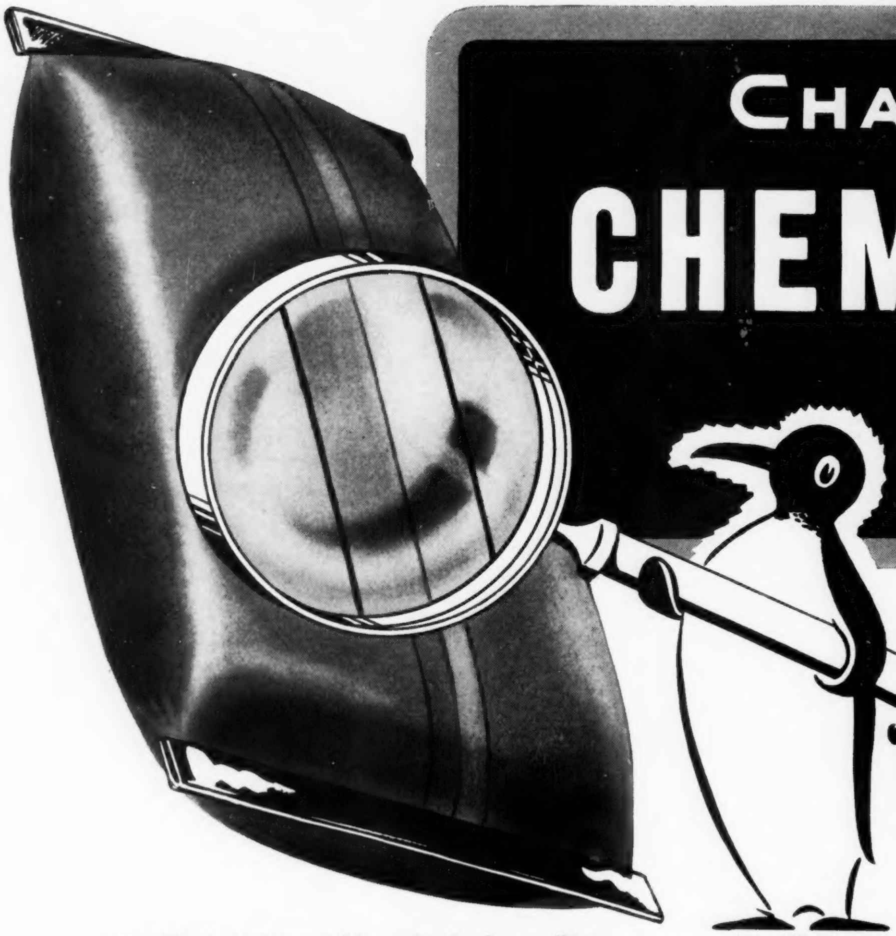

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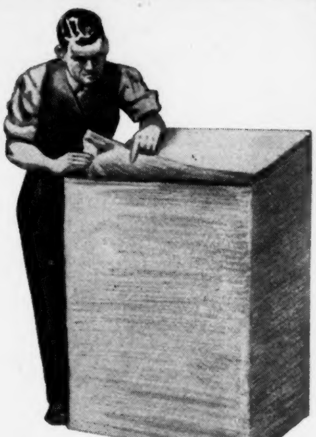

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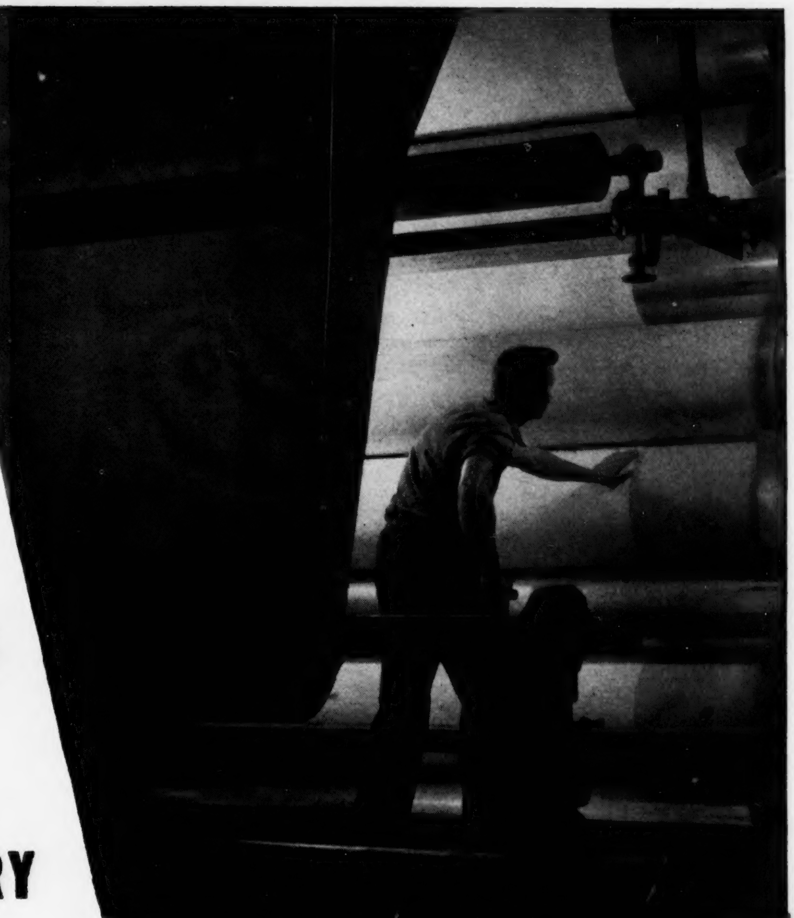

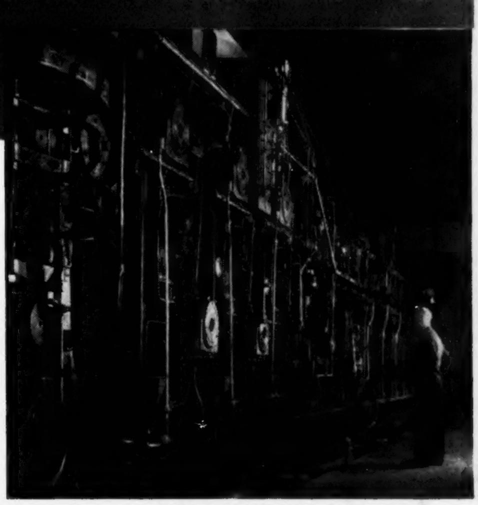

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Chemicals and Reciprocal Trade

C I EDITORIAL

Robert L. Taylor, Editor

For one reared on protective tariffs, chemical industry has not fared badly under nine years of reciprocal trade. In fact it has fared well enough to have reason to be pleased at the prospect of another three-year extension of the Trade Agreements Act of 1934, a prospect which at this writing appears to be good.

The Trade Agreements Act, already twice extended, was first passed by Congress on June 12, 1934, for the purpose of "increasing foreign markets for products of the United States through reciprocal adjustment of excessive trade barriers." Agreements with thirty countries have been signed under it, and three more are under study. Recently Secretary of State Hull, chief architect of the program, cited the fact that the annual average of exports to trade-agreement countries for 1939 and 1940 showed a rise of 87 per cent over 1934 and 1935, while the annual average of exports to non-agreement countries increased by only 32 per cent.

Similar figures for exports of chemicals alone are not available. However total exports of coal-tar, industrial and medicinal chemicals to all countries show an increase of 163 per cent from the 1931-35 average to 1940.

American chemical industry will have large exportable surpluses of materials after the war, and any system offering proved foreign market stimulation will be welcome. While it is true that disturbed world conditions have made it impossible to evaluate quantitatively the effects of the reciprocal trade agreements, there is at least evidence that the pacts have worked in the right direction. Also, it cannot be escaped that the principle on which they are based is sound. There is no other foundation for profitable world trade. We can export only if we import or if we loan money to pay for the goods we export. We tried the latter course after the last war. When the loans stopped, so did our exports.

Yet it will be unfortunate if the impression is created in this country or abroad that extension of the Trade Agreements Act is to be regarded as tantamount to endorsement by Congress of any or all post-war commitments the Administration may be thinking of making. There are political as well as economic issues to be decided. There are many economic questions to be answered which do not fall within the scope of this Act.

Are we, for instance, going to scrap all our Buna S, atabrine, and other synthetic products and return to natural products for which we are dependent on others, yet which the war has taught us we can do without? Are we going back to foreign sources of tartrates, chlorates and other important chemicals previously imported but that we have learned to make ourselves? Who in the chemical and dye industries does not remember how government protection through tariffs literally kept the breath of life in certain branches of these industries after the last war? Today those same branches have matured and not only outgrown the need for protection but are producing products that are superior to and cheaper than the ones from abroad they displaced, and at the same time are providing assured home sources of important materials in the present emergency.

The Trade Agreements Act in the form in which it now stands and in which it is expected to be continued makes provision for presentation of information and views by any interested person before a trade agreement is completed. Here is where industry representatives have an opportunity to present their case and aid in arriving at an intelligent decision on tariff concessions to be granted. It should be considered by industry not only an opportunity but a duty to present any pertinent information it has at such hearings. According to the State Department, "Concessions on imported products more or less similar to those produced in the United States are granted only when they are in the national interest, when reciprocal concessions are obtained therefore, and then after thorough study of all the factors involved."

Thus if it continues to be administered wisely, and the industry is alert to take advantage of the opportunities that are provided for expression, an extension of the Trade Agreements Act should work to the advantage of chemical industry as well as all industry and the nation. The greatest problem will doubtless always be what to import. As long as that can be solved intelligently, reciprocal trade cannot help but make for a stronger and more stable America.

Dean of Chemical Engineers: Behind every great material accomplishment lies an equally great spiritual accomplishment. Sometimes it may precede its material manifestation by many years, but if one digs far enough it is always there. It is what provides the spark, the zeal, the confidence in progress and the future, the ability to see things through, that are as necessary in building Boulder Dams and overnight synthetic rubber industries as are concrete and steel.

Some men are especially adept at inspiring in their associates these mental and moral prerequisites to accomplishment. Such men are the great teachers, the great leaders, the pioneers. One such man who is well known throughout chemical industry is Alfred Holmes White, retired head of the Department of Chemical and Metallurgical Engineering of the University of Michigan.

It is entirely fitting that some 350 friends and former students of Professor White should have dropped their war worries long enough last month to gather in Ann Arbor to honor this eminent chemical contemporary on his 70th birthday. Forty-five years of teaching at Michigan, during which he established the first separate department of chemical engineering instruction in the country, have brought Professor White in contact with some 2,500 students who have known him as teacher, counselor and friend. Many of these students are now themselves distinguished members of the chemical profession, and many have outstanding records in chemical industry.

Professor White is now devoting most of his time to professional interests other than teaching. He will conduct but one class this summer, and that only to assist his overburdened colleagues. But regardless of how he spends his remaining years, to his many old friends and students he will always remain the great teacher, congenial, inspiring, ambitious for those placed in his care. Chemical industry owes him much as a diligent pioneer in raising chemical engineering education in America to the high level it enjoys today. He richly deserves the unofficial title of Dean of American Chemical Engineers that is frequently bestowed upon him.

Put It To Work: The mere holding in reserve of discarded or idle equipment isn't going to do anybody any good. If all the old pumps, kettles, tanks, mixers and thousand and one other kinds of chemical equipment that are being held in various states of repair aren't put to work, they might as well be tossed back on the scrap heap from which they were rescued. At least they would then be providing good metal, and there is still plenty of need for that. Isn't it about time somebody had the authority or nerve to say use it or sell it on a lot of things still lying idle around chemical plants, things that don't have one chance in twenty of ever being put to use?

As far as equipment is concerned, conservation is a process of *using*, not *saving*.

There is special need at the moment for electric motors and generators. WPB's Electrical Equipment Branch is doing everything in its power to locate every idle motor and generator and get it back into active service, according to John Gammell, chief of the branch.

"Failure to put idle equipment to work steps up the demand for new equipment and wastes manpower and plant facilities that are urgently needed for the war effort," Mr. Gammell has said. "Steel, copper, aluminum and other critical materials are also wasted when new motors or generators are used instead of second hand ones that could adequately do the job."

Obviously this applies equally well to all types of equipment. If not already done, plant managements should provide for periodic checks on used equipment and set up some system of ways and authority for disposal of idle equipment that has no prospect of early use. Some of the larger companies with scattered plants have devised their own central offices for interplant exchange of equipment, thus stimulating interest in putting reconditioned items to work as well as making sure that something vitally needed at one plant is not lying idle at another. Smaller companies and individual plants will find it expedient to designate one person, perhaps in the maintenance department, to be responsible for all used equipment, its cataloging, reconditioning and disposal.

This matter of getting reconditioned items back into service is the important step of the whole equipment salvage program. Giving it the attention it deserves will benefit the individual plants cooperating as well as the overall war effort.

Our Gain: A short while ago the director of one of our leading industrial chemical research laboratories made the statement that there was little doubt in his mind but what the United States would emerge from the war as the world's major fountainhead of *fundamental* as well as *applied* chemical knowledge. Up until that time he had seen fit to confer on this country the distinction of "first" only in the field of applied chemistry. But with the deliberate suppression of scholarship in Germany under the Nazis and the almost mass exile of so many eminent German scientists he can see leadership in fundamental research as well.

The latest pointer in this same direction is President Raymond B. Fosdick's report on the Rockefeller Foundation for 1942. "Hitler's atrocities," Mr. Fosdick says, "have exiled to this country so many mathematics scholars that America is now the world capital of this science."

Mathematics is so necessary to any fundamental progress in its sister sciences, chemistry and physics, that this is indeed good news. One hundred and thirty-one of the world's leading mathematicians, including most of the faculty of Germany's great Göttingen, which once had the finest school of mathematics in the world, have been driven to this country by Nazi barbarism and are now contributing their expert knowledge to help destroy Hitlerism, the report says.

As history will doubtless reveal, the past several years have witnessed probably one of the greatest intellectual migrations of all time. There is every reason to believe that, given proper encouragement by government, the public, and business management, this nation is on the threshold of the greatest scientific and industrial development of its lifetime. Hitler's loss will be our gain a hundred fold.

Technical Manpower and Selective Service

By *Dr. Albert B. Newman*

The supply of technical manpower is vital in backing up our fighting forces with weapons and supplies. Yet current policies threaten a hiatus in technical manpower production. Dr. Newman, close to the picture as Dean of Engineering at C.C.N.Y. and as Regional Representative of Engineering, Science and Management War Training Program, lays the problem at industry's doorstep.

ENGINEERS, chemists and physicists are a part of the total war manpower of the nation. Numerically they form an insignificant part of total manpower. Taking engineers alone, a recent survey by the National Roster of Scientific and Specialized Personnel showed the total who were active at the end of 1942 to be about 280,000, or about one percent of the total males of draft age. Already about 53,000 of these are performing engineering services in the armed forces. If all of these engineers were dispersed and put to work performing non-engineering services, there would be hardly a noticeable effect on the general manpower situation. But such a dispersal would be the quickest way of losing the war; the war industries would soon be faced with partial and finally total paralysis; vital and continual improvements in war materiel would stop; we would soon find ourselves fighting the war with insufficient quantities of obsolete equipment.

Nothing as drastic as the complete diversion of technical men into non-technical services is going to happen in this country. Yet there are forces at work in this direction, and these forces must be resisted by those who see clearly what the consequences of complacency might be. The public, if given the facts in understandable form, will back any policy necessary to the winning of the war. As compared with the medical profession, the technical professions have done a very poor job in molding public opinion to an appreciation of their vital importance in war.

Engineering and the War Effort

It is timely to quote the National Roster on this point from its Bulletin No. 3 of April 13, 1943 on "The Personnel Situation in Engineering". To emphasize the official nature of statements issued by the National Roster, it should be noted that it is a unit of the Bureau of Placement of the War Manpower Commission.

"Engineers are responsible for the technical phases of the job of placing and maintaining industry on a wartime basis. The present enormous demands for these purposes are in competition with the expanding demands of the Army and the Navy caused by the increasingly technical nature of warfare.

"A comparatively small though critically important group of engineers is engaged in research and developmental work on new and improved war weapons.

"Trained engineers are also needed in connection with such essential civilian services as water supply, sewage disposal, transportation, communication, and public utilities, the problems of which are intensified in war-swollen communities."

The problem of technical manpower supply resolves itself into two main phases. First, the existing supply of engineers, chemists and physicists should be distributed where they will do the most good; many of them should be retrained to perform the most critical services; many others should be trained to upgrade their usefulness in their present assignments. Second, there must be a

well organized plan for maintaining a continuous flow of new technical manpower into the war industries and the armed forces.

Trends disturbing the balance between needs and supply of technical manpower are due to such factors as Selective Service, voluntary enlistments, Enlisted Reserves in the colleges, and the use of college facilities for Army and Navy training programs.

Selective Service and War Industry

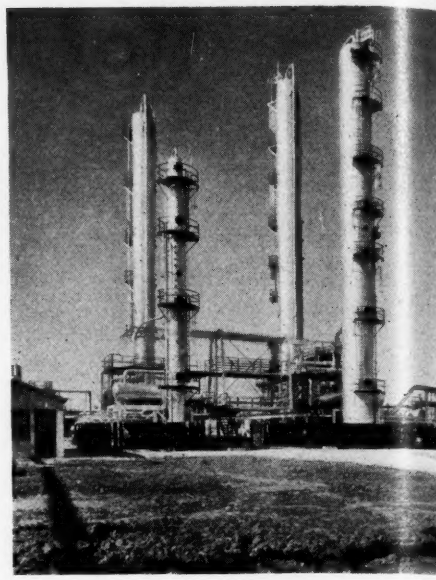
The Selective Service System has never been quite what its name would seem to indicate, an agency which would place each man of military age in the job in which he could contribute most toward the war effort. Rather, it is an instrument for drafting men into the armed forces, imposing upon war industry the responsibility for convincing Selective Service of its present and future needs for all kinds of manpower including the technically trained. Due to the fact that policy-making in Selective Service matters has been left to the managements of thousands of different companies, it is not surprising that there is great lack of uniformity throughout the country in the attitudes and procedures of industry, particularly in regard to the deferment of technical men. The actions of many companies have been governed by fear of public and governmental criticism and by a false idea of patriotism rather than a realistic approach to the question of greater and better war production. Also, many companies have failed to set up Selective Service organizations comparable with those they have set up to handle material priorities or taxation matters; thus they have failed to keep themselves currently informed on matters of policy and procedure as laid down by the Selective Service authorities. Within the scope of the enabling legislation, it may be truly stated that the Selective Service System has a fine record of performance; wrong decisions on occupational cases must be laid for the most part at the door of industry. At this point it should be stated that Selective Service headquarters policy definitely discourages the drafting of "Scientific and Specialized Personnel" in "critical occupations" and who are "engaged in activities necessary to war production or essential to the support of the war effort". This policy has been covered in various bulletins from National Headquarters of Selective Service System, the latest of which is Occupational Bulletin No. 10 (amended March 1, 1943). A reading of this bulletin and discussion with the very competent Occupational Advisers attached to each State Headquarters should convince anyone that Selective Service is aware of the necessity of conserving the limited pool of engineers, physicists, chemists and a few other professional types for war industry.

Many companies have not realized their obligation to cooperate in the over-all situation and have committed what seem to the writer to be serious errors in their handling of Selective Service cases. Perhaps the most common error is the result of a defeatist attitude due to the recent introduction of Manning Tables and Replacement Schedules. Without making a careful diagnosis, they conclude that they are not going to be permitted to hold the services of any young men. They fail to realize that the time required to train a replacement for a technical man is four years (somewhat less under accelerated programs) plus the time of training in the particular industry to develop maximum usefulness. Selective Service has no intention to draft into the armed forces men in critical occupations which require such long training periods.

Some foresighted concerns have provided themselves during the past two or three years with an oversupply of technical men. Instead of frankly advising some of their technical men to seek employment with one of the many concerns which are short of technical men, meanwhile keeping the men in deferred status, some companies have made out weak cases for these men before the Local Boards and have failed to appeal the resulting 1-A classifications, feeling very patriotic when inductions resulted.

Other companies have come to the erroneous conclusion that they cannot take on any technical men just graduating from college, because they have no hope of holding young men with training but without experience. These companies have failed to keep informed about National Headquarters policy as evidenced most recently in Occupational Bulletin No. 33-6 (amended March 1, 1943) in which a student in a "critical occupation" is deferable to graduation (up to a certain date) and for a period not to exceed 60 days after graduation "in order that he may have an opportunity to engage in a critical occupation of his profession in the armed forces or in an essential civilian activity, provided that during such period the registrant is making an honest and diligent effort to become so engaged". Is it asking too much of industry that it keep informed on such policies and cooperate in carrying them out?

A company serving its own interests as well as the national interest in the war effort will determine the number of technical men it needs in order to keep itself up to a high level of technical competence. If it has more than it needs, it will make its selection of those it must keep, and will advise the others to seek employment elsewhere, protecting their deferred status for 60 days, in keeping with Selective Service policy. Then the company will retain the services of the others by using all of the legitimate Selective



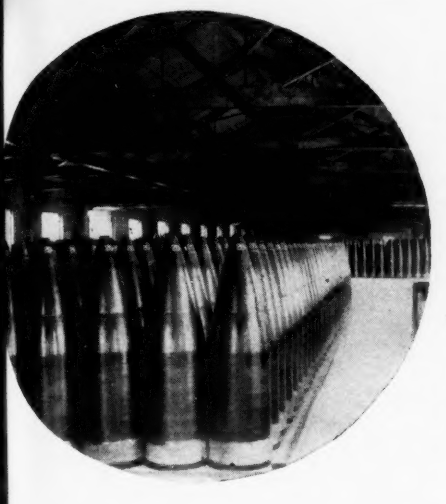
This synthetic toluene plant in Texas typifies the modern chemical plant which needs technical manpower to keep T.N.T. and other vital materials and munitions flowing to the battle fronts.

Service procedures, and will take on newly trained technical men to replace those it loses by death, retirement and voluntary enlistment, and such additional men as it needs as expansion proceeds.

The procedures for retaining the services of needed technical men are not complicated, but require intelligent handling. First there is the well known Form 42A to be filed with the Local Board. In cases where a technical man is newly hired, the 42A should be filed immediately. This form should give complete information about the registrant's duties and training, and the Occupational Bulletin covering the case should be quoted. If the Local Board nevertheless classifies the registrant in 1A, an appeal should be filed with the Local Board. Permission does not have to be obtained from the Local Board to file such an appeal, and the Local Board must transmit the appeal to the Appeal Board, unless the Local Board decides to reclassify the registrant on its own initiative, as sometimes happens. If the case goes to the Appeal Board and if the Local Board is sustained in its 1A classification, the matter should be presented to one of the Occupational Advisers at State Headquarters of Selective Service. If the Occupational Adviser is convinced that the case has been decided contrary to the occupational bulletins currently effective, he will send for the file and study the case with a view to further action. While he has the file, no induction can take place. If he still believes that the case has been decided erroneously, he will request the Local Board to reconsider it, failing which he may make an appeal in the name of the State Director to the Presidential Appeal Board.

Cases handled in the above manner are not rare; they are routine. The machinery has been been set up and is expected to be used. If for some unavoidable reason, the company failed to file an appeal within the ten day period allowed, the Occupational Adviser should be consulted; he may decide to request the reopening of the case. Generally speaking, the registrant should not be a party to the case; deferment is not given in his personal interest but in the national interest. In general it should also be emphasized that Occupational Advisers should not be asked to examine a case until an adverse decision has been made by the Appeal Board. Legal counsel is totally unnecessary and should not be engaged.

Quoting again from the Bulletin of the



National Roster: "The more acute the shortage of engineers becomes the greater is the necessity for assuring the proper placement of each engineer in a job where he can contribute his total abilities to the war effort. Also it becomes necessary to make certain that those engineers who are required by industry should be given occupational deferment."

Technical Men in Training

The old Occupational Bulletin No. 10 provided only for the deferment of juniors and seniors in engineering and other critical occupations. It was in effect until December 14, 1942, some time after the 18-year draft was in effect. In this interval numbers of freshmen and sophomores who had reached age 18 either dropped out and enlisted or joined the Army Enlisted Reserve Corps or the V-programs of the Navy, and are thus lost to war industry. On December 14, 1942, the amended Occupational Bulletin No. 10 was issued. It provided for the deferment of sophomores in engineering in addition to juniors and seniors, but sophomores in physics and chemistry were not made deferable, presumably on account of the impossibility of positive identification of physics and chemistry majors in liberal arts curricula as early as the sophomore year.

Then on March 1, 1943, there was issued Bulletin No. 33-6 (sometimes called No. 11), providing for the deferment of freshmen in accelerated programs. This was accomplished by stating that students in critical occupations who can graduate by July 1, 1945, are eligible for deferment. According to the Bulletin of the National Roster:"Industry is thus assured of some young engineers, other than those who cannot physically qualify for military service, through 1945". This statement from a unit of the War Manpower Commission is reassuring in the face of the fact that it is no secret that those heading the Army Specialized Training Program are pressing hard for the early termination of all student deferments.

The College Situation

Whether or not deferments are to be provided in the future for technical men in training, the war industries are not going to get many newly trained technical men from the colleges. Voluntary enlistments of students before graduation is accelerating rapidly. Some colleges do not believe they can train soldiers and civilians on the same campus. Frankly, the presidents and trustees of colleges have every incentive to dismiss all civilian students and to fill up with Army or Navy trainees. The principal incentive is money; the Army and Navy undertake to pay all costs, while civilian students pay only a fraction of cost of education, the balance coming from endowment income or taxation; industry makes no direct contribution to cost. The other principal incentive is that of public relations; the general public, totally uninformed about the needs of war industry, will applaud the college which goes one hundred percent military. There is no doubt that the Army and Navy programs in the colleges will disrupt the production of technical manpower for war industry. It is too long a story to tell all details, but there are a few obvious ones. The Navy is setting up no training for chemical engineers; therefore some of the colleges assigned to the Navy are planning on disbanding their chemical engineering departments. As to the Army program, there has been much criticism on account of the brevity of the programs; in setting up these curricula an attempt was made to include most of the advanced subjects of the usual four year course in 18 or 21 months. It is obvious that such advanced training cannot be accomplished in less than three years on accelerated programs. Certainly the abbreviated Army programs would be nearly useless as preparation for industry.

The National Roster estimates a total demand for additional engineers for 1943 to be 40,000 to 50,000. Graduating from the collleges will be 17,000, of which at least 6,400 are committed to the armed forces.

Meeting the Shortage

Some progress has been made in the training of women as engineering aides. Full time courses running from ten to fifty weeks have been set up by the Engineering, Science and Management War Training program of the U.S. Office of Education and by some private industries giving engineering training to women in engineering colleges. Each such woman trained and assigned to a group of engineers will relieve that group of some of its minor engineering duties and thus increase their capacity in handling the advanced phases of engineering. The upgrading of engineers on their own jobs is being accomplished by means of ESMWT courses. These auxiliary training programs are a great help, but they do not solve completely the problem of the shortage of fully trained engineers.

War industry has been inarticulate on this question. Evidently the managements of industry have felt that their interests were being looked after by the administrators of engineering colleges, who have done most of the talking on this subject. The self interest of the colleges being against continuing civilian training, and no help being forthcoming from management of industry, the engineering college administrators are pretty well fed up unless powerful pressure is brought to bear by industrial management.

It seems perfectly plain that the engineering colleges should continue to select freshmen under 18 years old up to the limits of capacity. From that point on, the Army and Navy should be allowed to pick only those whom they regard as potential commissioned officer material, physically and otherwise, and in no case to exceed fifty percent of the total. The remaining fifty percent should be earmarked for industry and pushed through to graduation on a draft deferred basis. For this industry group it might be necessary to press for legislation setting up and financing a War Manpower Commission Training Corps. In no case should the trainee request his own deferment; he should be frozen to the training job. The fifty percent in the military group could be trained in whatever way the military authorities decide.

It is up to industry to press for a quick and satisfactory solution to save this rapidly deteriorating situation. Otherwise industry is faced with a hiatus in the production of technical manpower.

Quoting from a dean of engineering, "It seems to me to be about as logical to shut down the Navy Yard and the Army camp as it is to dry up the source of trained men for war industry".

Alcohol from Granular Wheat Flour

How the granular wheat flour process, coupled with persistence and a high grade of Yankee resourcefulness, licked a discouraging raw materials problem and is now supplying part of the 500,000,000 gallons of war alcohol needed this year.

***By* P. A. Singleton**
Assistant to the President
New England Alcohol Co.

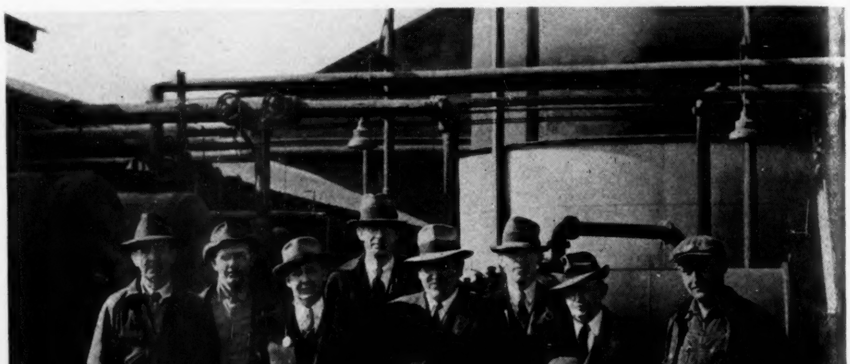
WPB's 1943 industrial alcohol quota calling for a total production quadruple that of normal years set a difficult goal for eastern seaboard producers. New England Alcohol Co. wanted to do its part in this war program, but its plant at Everett, Mass., had been designed for production from molasses only. With complete stoppage of molasses tanker movements from Puerto Rico by mid-1942, the plant was almost at the point of shutdown for want of raw materials.

Brief respite was found in Government owned molasses shipped in tankcars from New Orleans and from Port Everglades, under the auspices of the Defense Supplies Corporation. Obtainable quantities were limited, however, and the difficulties of getting delivery were accentuated by the fact that molasses tankcars were readily interchangeable with the tankcars used for fuel oil.

A temporary alleviation was also found in the high wines program of Defense Supplies Corporation, whereunder the New England Alcohol Company served as processing agent for DSC, taking tank truck shipments of green whiskey at proofs ranging from 140 to 160 and rectifying these so called "high wines" to 190 proof industrial ethyl alcohol. However, the total quantities of high wines handled accounted for only about a third of the plant's production capacity. The redistillation and storage equipment alone were used, leaving fermenters and the yeast room idle.

Seeking other expedients, the company investigated possibilities of additional available substitute raw materials. Raw sugar was among the first sources of alcohol considered, but cost was prohibitive. Tests were conducted on the dehydration of blackstrap molasses in the West Indies in the hope of permitting dry cargo shipment inasmuch as these ships were much less critical than tankers. However, briquetted molasses did not prove feasible.

Consideration was given to the use of potatoes, which would have been available from Maine. High cost precluded this raw material. Corn syrup, and sulfite liquors from paper mills were both considered but neither of these proved practicable.



Men responsible for the speedy conversion of New England Alcohol Company's Everett plant from molasses to granular flour. These men worked day and night on the job. Left to right: E. L. Goodwin, C. M. Miller, E. F. Riley, E. W. Haywood, W. E. Dickson, R. S. Hood, H. L. Woodman, and C. P. Hardy.

All factors considered, the use of grain seemed by far the best solution to the problem. There were, however, formidable obstacles which blocked immediate erection of a grain conversion plant at Everett. First among these was the complexity of equipment required. The engineering design was complicated by critical shortages of materials and equipment.

Nevertheless, at the request of WPB, a complete PD-200 Project Rating Request was prepared, based on the utilization of 100% corn as raw material. Shortly, thereafter, it was necessary to redesign the plant for the use of mixtures of wheat and corn, or alternatively for 100% wheat because of foreseeable shortages in the supply of corn available for alcohol production. This introduced new complications, particularly in connection with foaming and also in connection with slop disposal. The use of straight 100% wheat presented the greatest foaming difficulties. Both of these plant designs contemplated the use of continuous pressure cooking. Both required critical steam dryer equipment for slop disposal. Steam for the dryer would have required additional boiler capacity.

Either conversion would have required approximately $250,000 of capital expenditure and at least $40,000 worth of critical materials. Deliveries of critical materials were uncertain. Neither of the two plants proposed could have been erected in less than four months construction time, probably longer. In view of the eastern seaboard location of the plant the postwar economic prospects of peacetime operation using grain as raw material seemed unfavorable unless subsidized by the Government. Resumption of tanker movement of cheap byproduct blackstrap molasses from Puerto Rico to Everett seemed highly probable as soon as sea lanes were reopened. This situation complicated financing arrangements. However, discussions were carried through with Defense Plant Corporation in Washington based on wartime operation of the plant conversion and dedication of all facilities and manpower of the Company to alcohol production from grain.

At this point the engineering design again had to be revised because of the refusal of WPB to approve *any* slop disposal equipment. This saved critical material but increased production costs because it cut off the economic advantages

of recovering the protein value in "still slop" to produce a "dried distiller's grain" for animal feeding. Eliminating the screens and driers also reopened the problem of getting rid of the slop—by dumping in the sewer, or otherwise. Especially in summer months, this sanitary problem has been a serious consideration for all distilleries. In winter, slops find a fairly ready market. In summer, however, farmers find green pasture to be cheaper. Also, spoilage and the fly problem become serious.

Granular Flour Program

A much better solution to the problem came in the almost concurrent announcement of the Commodity Credit Corporation granular flour program in December, 1942.

Granular flour resembles Cream of Wheat or Farina in appearance. It is clean, white and free from bran. From 35 to 43 pounds of granular flour are secured per 60 pound bushel of wheat, depending on its starch content. Granular flour is uniform in quality despite variations in whole grain used; variations are taken up in the part of the whole grain which goes into the bran.

The granular flour program has the dual feature of making use of idle milling capacity (without interference with flour grinding) as well as enabling the commercial production of alcohol from grain with drastic reductions in capital equipment required.

It was announced that Commodity Credit Corporation had instituted the plan on an experimental basis for three months previous and that the plan had proved its worth. Proposal was to sell granular flour at a fixed price delivered to distilleries. Purpose was quickly to assure production of 500 million additional gallons of industrial alcohol believed necessary in 1943 for the war program. Approximately 300 million bushels of wheat were to be made available for this purpose.

The plan was sanctioned by a clause in the 1943 Agricultural Department Appropriations Bill which stated that wheat could be sold for a price as low as 85 per cent of the parity price, provided its use was limited to manufacture of industrial alcohol or as feed. Frank Hutchinsons of Lawrenceburg, Ind., who then served as Advisor to the Grain and Feed Section of War Production Board Food Branch was appointed to develop the granular flour program for WPB. Millers were to get their compensation from the residue feed remaining from the bran after grinding and milling. Cost of transporting wheat from the farm or CCC storehouses to the millers and the cost of transporting flour from the millers to the distilleries was to be borne by Commodity Credit Corporation. Contracts were made between distilleries and millers on a quarterly basis covering requirements. Only restriction on use was that the granular flour must be used exclusively for ethyl alcohol production. Shipping orders were to be placed directly with the milling company.

The selling price on granular flour has been established on the basis of starch content to make it roughly equivalent to wheat at 80 cents per bushel, corn at 90 cents per bushel.

This gives a price f.o.b. distillery of about $32.14 per 2,000 pound ton of granular flour conversion. Additional charges are made for bagging and deposit on bags if material is thus handled. Based on hoped-for yields, this gives a raw material cost for alcohol ranging from 35 to 45 cents per gallon, a price too high to compete with normal alcohol under peacetime conditions but fairly competitive under war conditions so long as CCC grain prices are continued.

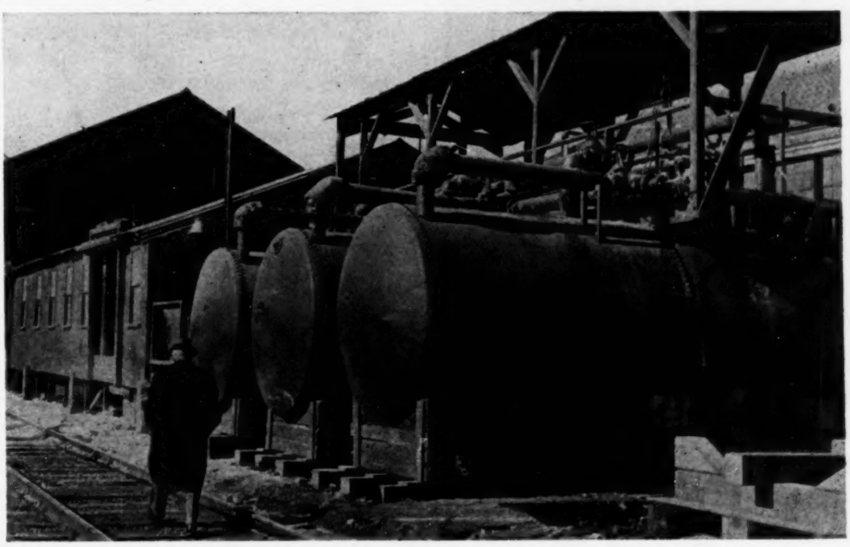
Full credit should be given to E. I. du Pont de Nemours & Co., Inc., whose Alcohol Division pioneered the first American commercial production of ethyl alcohol from granular wheat flour. Du Pont's Deepwater plant had formerly used molasses. They were quick to sense the advantages of granular flour. Their plant was readily convertible because they had sterilized molasses by heating before fermentation and could adapt the heating tanks for cooking a granular flour slurry. From initiation of operations on a small scale the plant capacity has been increased steadily. It is now producing thousands of gallons daily. A debt of gratitude is owed to the management and personnel of the du Pont Alcohol Division for their willing cooperation in the expansion of the granular flour program.

Problem Faced by New England Alcohol Company

The use of granular flour offered a welcome solution to New England Alcohol's problem. Company engineers did their best to modify the design to use equipment locally available. Purchasing department scoured the market with men in cars visiting all local junk yards, second hand dealers, and hardware stores to get necessary equipment, fittings and connections. Cooperation was secured from the local Tax Unit, Bureau of Internal Revenue, to arrange the necessary permits for plant operation and changes of design. Priorities were secured from WPB for the exceedingly small quantity of critical materials requiring preference ratings. Approval for company financing was secured from management and the plant design and erection was completed in one month's time. The unit started operations as scheduled on January 1, 1943.

Operation and fermentation difficulties have been encountered since initial operation but these are gradually being eliminated. Full production of 10,000 gal. daily has already been achieved with the initial granular flour unit, and the installation of

Right: Unloading malted grain into hopper of malt grinder. Below: Secondhand car tanks used as cookers. Grain unloading and storage shed in rear.



additional equipment to increase this capacity is contemplated.

Basic advantage of the granular flour process is its simplicity and elimination of costly equipment of special design. No new buildings are required. Cooking is done outdoors. Four of the existing fermenters are located outdoors, others are inside. It has not yet been established whether outside cooling of all fermenters will be necessary. Description of the operation at the converted plant of the New England Alcohol Company at Everett follows:

The granular wheat flour is received in 100 lb. bags, which are opened in the car and dumped into the wheat slurry tank which is located close to the car. This slurry is continuously pumped to a cooker at a temperature of 80 to 100° F. After the cooker is full, slurry is cooked for the desired time and then the malt is added through the malt slurry tank. A few minutes later, the mixture is pumped through a cooler to reach the fermenter at about 84° F. The yeast is made up in molasses and amounts to 4 per cent of the total fermented volume. Fermentation requires three days, during which time the temperature should be kept below 92° F., although in some cases the temperature has reached 100° F. without causing serious loss. The fermenters require about eight hours for filling, and will usually hold seven 8,000 gal. cooks without foaming over. Three cookers are necessary in order to maintain more or less continuous flow to the fermenters.

Mechanical parts of the plant worked out quite satisfactorily, even though most equipment was made from scrap material or purchased second-hand. The biological part of the process has presented difficulties. At first, very low yields were attained, ranging from 4 to 6 proof gallons per hundred pounds of drying grains excluding yeast inoculant. It is now believed that these low yields were caused by preparing the yeast in high-test molasses. After shifting to blackstrap molasses, the yields raised to 8.5 to 9.5 proof gallons. Unfortunately, these higher yields only lasted for several days, after which the efficiencies started to drop owing to infection getting into the system. After sterilizing the equipment and taking steps to prevent further infection, yields have climbed up to 10.4 and indications are that they will improve somewhat more. It has been concluded that more care must be taken to prevent infection in this wheat process than formerly was required on molasses.

The strain of yeast used is Seagram's No. 31. Laboratory results indicate that high test molasses may be used if some buffer salts and yeast food are added to the fermenter.

Equipment

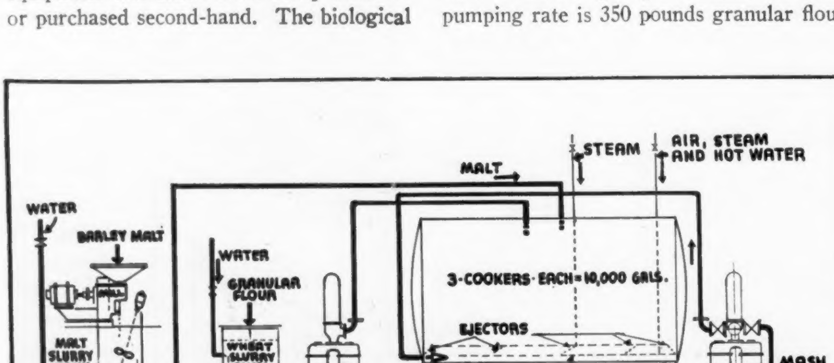
Wheat Handling: The bags are dumped into a slurry tank 3 feet in diameter and 3½ feet high set into a platform at the height of the car floor. The tank is close to the edge of the platform to permit handling directly from the box car. Agitation in this tank is obtained by running water in through a sparger equipped with nozzles set at an angle. Liquid level in the tank must be kept low to avoid dough formation. Temperature of the water is 80 to 100° F., which works much better than lower temperatures. Normal water flow is 150-200 gal. per minute. Normal pumping rate is 350 pounds granular flour per minute with a maximum of 500 pounds per minute. A duplex pump is used to pump the wheat slurry to the cookers.

Malt Handling: The malt is received in bags and ground in a No. 00 Raymond hammer mill. It is mixed with water in a 100-gal. drum equipped with a stirrer type mixer. The resulting slurry is pumped by a centrifugal pump to the cookers. Grinding rate is about 700 lbs. per hour. Screen test of ground malt shows about 50 per cent through 60 mesh.

Cookers: These consist of second-hand 10,000 gal. car tanks. They are steam-heated through five suction tees all pointed towards the same end of the tank and inclined upward at an angle of 30 degrees. An air sparger is also installed to assure mixing of the premalt with the wheat during the filling period. While the main malt is being added, and until the cook is pumped to the fermenters, circulation is secured by pumping out of one end and returning through an off-center nozzle at the other end. A duplex pump is used for this circulation and for pumping through the cooler to the fermenters.

Coolers: A second-hand condenser about 4 ft. diameter by 10 ft. long was used. It had 800 one-inch copper tubes. The heads were modified to provide seven passes for the mash flow. This will cool about 200 gal. per min. from 145 to 86° F. when clean and with cooling water at 36° F. Velocity through the cooler is about 1½ ft. per sec.

Fermenters: Four spherical bottom tanks and six flat bottom tanks were used, each with a capacity of about 75,000 gallons. Three of the flat bottom fermenters have been partly equipped for cooling by running water down the outside. The spherical bottom fermenters are outdoors and require very little cooling in winter. In summer they may be cooled by allowing water from a hose to spread out and run down the sides.



FLOW SHEET FOR GRAIN MASH

Results Obtained

Although difficulties have been encountered in initial operation, the net result has been a sizable production, dating from the first of the year, of additional alcohol for the war program which could not have been made until June, 1943, at the earliest with conventional equipment, and which production would have been lost completely except for the conversion to grain, molasses being no longer available.

The action of New England Alcohol Company brought a prompt letter of congratulation from Dr. Walter G. Whitman of WPB Chemical Division on January 12. However, real thanks and proper acknowledgement should be made to the personnel of the Alcohol Division of E. I. du Pont de Nemours, who developed the first commercial granular flour plant, which served as the basis for the WPB program.

Some Important Higher Court Decisions in 1942 Involving Sales Contracts

By Leo T. Parker

During the year 1942 numerous firms throughout this country have been subjected to suits on sale contracts. It is readily apparent that in an impressive majority of these suits the companies involved may have entirely and easily avoided liability if they had been familiar with the various modern trends of the law on sales contracts.

UNDER the law a valid contract is an agreement between two or more parties, firms, or corporations, by which each is *expressly* or *impliedly* obligated to do *something*, not prohibited by law, within a predetermined period. Ordinarily, valid contracts need not be in writing, excepting certain kinds of contracts which relate to real property, suretyship and a few others that are required by law to be in writing.

An "expressed" contract is an agreement the exact terms and conditions of which are thoroughly understood by both contracting parties. An "implied" contract is one where the court presumes a *promise or obligation* on the part of one party or both parties to the contract. This means, of course, that the court, after reviewing the testimony, will decide that the seller is obligated on a warranty that he did not intend to make, but which in fairness to the purchaser is implied as being fair and honest.

This is a well-established fundamental of law but various courts will differ in its interpretation and application.

War Conditions Variable

Obviously, war conditions, priorities, allocations, etc., have had a very important legal effect on otherwise valid and enforceable contracts for sale of merchandise. Quite naturally the chemical trade has not been so fortunate as to avoid controversies resulting from present unusual and abnormal conditions.

Therefore, in order that readers shall have at hand definite and dependable legal information of unusual rights and liabilities of buyers and sellers, at this particular period, we shall review several relevant higher court decisions which involve variation of law as currently interpreted and as influenced by war conditions.

First, it is important to know that the higher courts will not always excuse a seller who fails to complete a valid contract of sale on the excuse that the purchaser, who enters complaint, has no priority rating.

For example, in *James Pels Company v. Republic Chemical Corporation*, 31 N.Y.S. (2d) 857, reported February, 1942, it was shown that a buyer and seller entered into a contract of sale by the terms of which the seller agreed to supply the purchaser with a stipulated quantity of sodium bichromate on certain dates at agreed price. When the times or dates for delivery arrived the seller did not fill the orders. Upon complaint registered by the purchaser the seller explained the reason for non-delivery was that the purchaser had no priority rating and that orders had been received from purchasers who had priority ratings, and that after such orders were filled no sodium bichromate was in stock to fill orders or contracts previously made with purchasers who had no such priority ratings.

However, it is interesting to observe that this higher court laid down modern law to the effect that the excuse that all sodium bichromate owned, held, or controlled by the seller, or obtainable from *usual* sources of supply had been allocated to orders entitled to preference for national defense purposes, and that no surplus was available to fill the purchaser's order, which was for nondefense purposes and carried no priority ratings, *was insufficient* for failure to show that the seller was unable to obtain sodium bichromate from sources *other* than its *usual* sources in sufficient quantities to fill orders.

This new decision means in plain language that a seller cannot avoid liability for failure to complete a contract of sale by merely explaining that its stock was taken by firms who demanded immediate delivery and who had priority ratings.

In order that a seller may avoid liability for failure to complete and fulfill a contract with a firm who does *not* hold a priority rating he must *prove* that he faithfully and honestly endeavored to obtain the merchandise from sources, *other than his usual sources* and that he could *not* obtain the merchandise.

Public Policy Laws

Modern courts hold that contracts between chemical companies and others must have a "public interest" before a court will require a company to sell its product to an ordinary retail dealer. And, according to a late higher court decision, various companies may without liability agree between themselves *not* to sell to particular retail dealers.

For instance, in *Line v. Colonial Company*, 17 S.E. (2d) 502, reported July 1942, it was shown that the plaintiff was engaged in the retail business. He had a contract with a company under which he obtained products at wholesale prices to retail to his customers. He sued certain companies and alleged that he was and had been engaged in the retail business; that various companies agreed not to sell their products to him and that by reason of such unlawful combination he was unable to obtain material economically and at a price which would enable him to conduct his business at a profit; and that as a result thereof his business had been ruined and destroyed.

The higher court refused to grant relief to the plaintiff and said:

"This action involves a controversy of a private nature between plaintiff and the defendants. No public interest is involved."

On the other hand, modern higher courts hold that contracts contrary to public policy and against public interest are void.

For example, in *Uvalde Company v. Shannon*, 165 S.W. (2d) 512, reported November, 1942, it was disclosed that a seller brought suit against a purchaser to recover damages for breach of an alleged contract for the purchase of a stipulated quantity of merchandise.

During the trial testimony was given to the effect that the seller had obligated himself *not* to furnish information concerning the same or similar merchandise to competitors. It was admitted that this agreement was made in order to enable the purchaser to sell the merchandise upon more favorable terms to himself.

The higher court refused to allow damages to the seller, and said:

"The contract in question undoubtedly tended to lessen competition. . . . By the way of examples of contracts contrary to public policy is that they tend to be injurious to the public or against the public good, includes contracts to stifle competition. . . ."

In *Marvin v. Solventol Chemical Products,* 298 N.W. 782, reported September, 1942, it was disclosed that a contract was made whereby a loan was made to a chemical corporation which agreed that a director named by the lender should be comptroller of the corporation and should have complete charge of all finances of the company and that no expenditures should be made without the comptroller's approval.

It is important to know that, in later litigation, between the buyer and seller, the higher court held that this contract could not be enforced since the contract was contrary to "public policy" in that it would take the affairs of the corporation out of the hands of the board of directors and transfer them into the hands of the comptroller named by the lender.

It is quite apparent that a person who enters into contract obligations at this modern and unusual period should review the law pertaining to "public policy."

Monopoly Laws Explained

During the past few months the Federal monopoly laws have considerably varied and changed.

Modern higher courts hold that the true test of the legality under the Sherman and Clayton Anti-Trust Acts, of an agreement or regulation restraining trade, is whether the restraint is such as merely regulates and perhaps thereby promotes competition or whether it is such as may suppress or destroy competition. Ordinarily, if the acts, agreement, or contract of sale tends to suppress or destroy competition the Anti-Trust Acts are violated.

On the other hand, a recent court held that where a manufacturer or seller deals in *patented* products or mechanism the patent license agreement with the licensee may contain a valid clause that the licensee must observe the same retail sale prices for the product as established by the patent owner who grants the license. See *MacGregor v. Westinghouse,* 130 Fed. (2d) 870.

Another important point is that the Clayton Act recently was amended to make it unlawful to "discriminate in price between different purchasers." It is important to know that a modern higher court held this amendment relates *exclusively* to *actual* purchasers, and *not* to others who presently desire or demand to purchase the product. See *Glenn,* 42 Fed. Supp. 709.

Also, see *Sarrentino,* 48 Fed. Supp. 709, reported November, 1942. This court held that past purchases from a manufacturer does not make a dealer a legal "purchaser" within the new amendment to the Clayton Act. An important point of law decided by this court is that a manufacturer is not liable or responsible for his refusal to sell his products to certain dealers, although he sold such products to another dealer in the same State area.

Ceiling Price Law

Another unusually important branch of law relates to arbitration agreements. Personal opinions differ as to the advantages and practicability of arbitration clauses in contracts. No doubt, in many instances, differences in personal opinions arise from variation in experiences of those who have been subjected to arbitration clauses.

Take for example the late and leading case of *Kremer,* 43 N.E. (2d) 492, decided by a New York higher court, in July, 1942. In this case a contract for purchase of merchandise between a buyer and seller clearly stipulated that "any controversy arising under or in relation to this contract shall be settled by arbitration."

A buyer and seller entered into a contract for the sale of merchandise at a stipulated price. The seller contended that the establishment of "ceiling" price automatically invalidated this contract and that he was not required to make delivery.

However, the purchaser contended that this was a matter of arbitration and that in accordance with the above-mentioned arbitration provision in the contract the dispute should be decided by the arbitrators.

It is interesting to observe that the higher court held that the arbitrators could not enter into this discussion and refused to permit arbitration, and also held that the contract need *not* be performed by the seller since the contract was automatically cancelled by the "ceiling" price order which was considerably less than the price the purchaser had agreed to pay for the merchandise.

Since this case is the leading one on this subject, it is apparent that contracts of sale are automatically cancelled and rendered void, if the present "ceiling" price is lower than the price specified in the contract of sale. This law is applicable whether the contract is verbal or in writing with proper and legal witnesses.

Validity of Contracts

Since litigation of a contract always is unprofitable, it is important that readers have a dependable rule which distinguishes valid and invalid contracts. A review of decisions by modern higher courts discloses that a sale contract is valid and enforceable if: (1) one party submitted an offer which the other party *unconditionally* accepted in detail; (2) neither party deceived, misrepresented, or exerted unlawful influence or force with respect to the other party to induce making the contract; (3) both parties agreed absolutely and positively to perform one or more definite acts, which means that the buyer must promise to pay a definite amount for definitely specified and described merchandise; (4) both parties were of legal age and of sound mind when the contract was made; (5) both parties had proper and legal authority to make the contract; and (6) the objects of the contract are lawful, not against public policy, and not deceptive.

Obviously, modern courts, plus unusual and extraordinary conditions somewhat vary this usual law.

It is old law, for example, that "impossibility" entitles the seller to rescind a contract without liability. However, this old law is based upon the principle that such "impossibility" arises from sources other than natural ones. For illustration, a seller who agrees positively to supply certain merchandise cannot avoid liability unless he pleads an Act of God, or similar cause of impossibility.

Notwithstanding unusual war conditions a seller must complete a contract if he can do so without violating valid laws or regulations.

For illustration, in *Globe Crayon Company v. Manufacturers Chemical Company,* 31 N.Y.S. (2d) 691, reported January, 1942, it was shown that a seller verbally agreed to supply a purchaser with a stipulated quantity of stearic acid at an agreed price. The merchandise was to be delivered to the purchaser on named and predetermined dates. The total quantity was 14 tons of the stearic acid.

However, the seller failed to complete this contract because it appeared that stearic acid was not at this time readily available. The purchaser went into the open market and purchased a substitute, although later testimony proved that stearic acid was available. The purchaser sued the seller for damages amounting to his actual and provable loss which resulted from use of the substitute.

Actually this modern higher court held that in defense of the purchaser's suit for breach of the alleged oral contract to deliver 14 tons of stearic acid, where it appeared that on the dates of the alleged breach there was available in the New York market sufficient stearic acid to supply the buyer's requirements, the buyer could not charge the seller with the price the buyer claimed to have paid for a substituted article, of which a larger quantity was required for an equivalent efficiency. In other words, the maximum damages to which the buyer was entitled were measured by the difference between the contract price and the market price at the time of alleged breach.

Therefore, it is quite apparent that before a purchaser may go into the market and purchase a substitute for the contracted merchandise, and subsequently expect the seller to stand the resultant losses, such purchaser must be certain that no merchandise of the character specified in the contract is available.

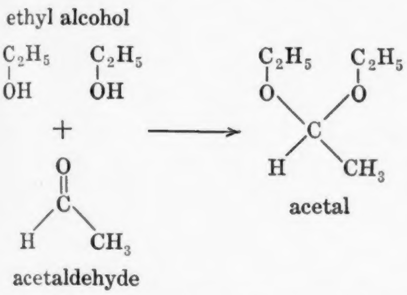
Vinyl Resins in War and Peace - II

By Russell B. Akin

Plastics Department, E. I. duPont de Nemours & Company, Inc.

In Part I of this article, which appeared last month, Dr. Akin discussed vinyl chloride, vinyl acetate, polyvinyl alcohol and vinyl chloride-acetate copolymers. This month he covers the polyvinyl acetals and vinylidene chloride, completing his survey of this very important wartime group of resins.

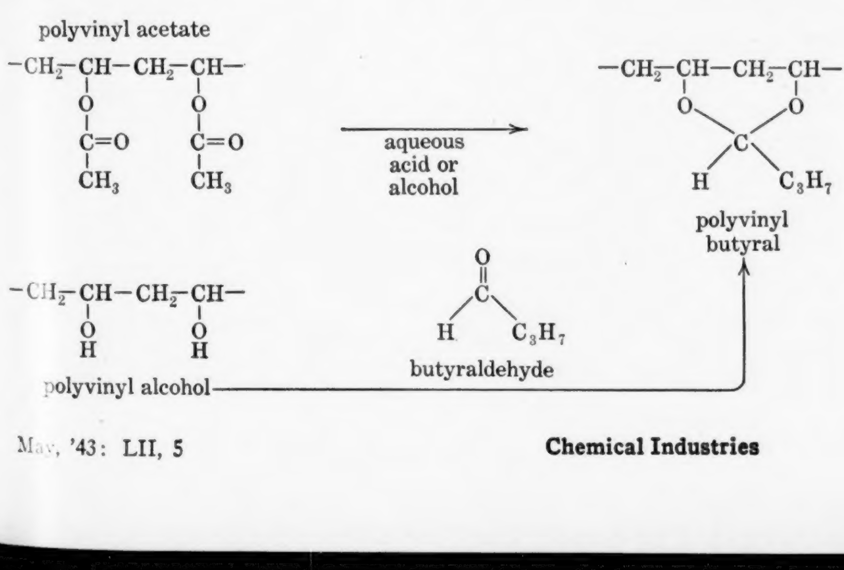
UNDER dehydrating conditions, acid catalysts will cause reaction between two alcoholic hydroxyls and the oxygen of an aldehyde. The first such product was obtained from ethanol and acetaldehyde, and was called "acetal."



When other aldehydes as formaldehyde or butyraldehyde are used, the products are called formals or butyrals. The term "acetal" is used in a generic way for all these products, as well as referring specifically to products of acetaldehyde.

Similarly, reaction products between aldehydes and polyvinyl alcohol are broadly called polyvinyl acetals. The individual resin is called polyvinyl formal, polyvinyl acetal or polyvinyl butyral, accordingly as the aldehyde is formaldehyde, acetaldehyde or butyraldehyde.

Polyvinyl acetals may be made by direct reaction between a polyvinyl ester and an aldehyde, or by sequential hydrolysis of a polyvinyl ester and condensation of that polyvinyl alcohol with an aldehyde:

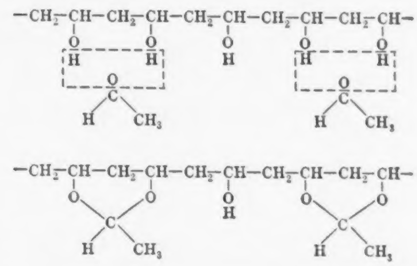


By either one-stage or two-stage synthesis, the amount of aldehyde used may be less than equivalent to the amount of hydroxyls made available, and the carbon chain of the final product may sometimes have hydroxyl, acetate and butyral groups.

Commercially available polyvinyl acetals contain small or negligible amounts of residual ester groups. The amounts of acid catalyst and proportion of aldehyde required to carry out acetalization of polyvinyl alcohol are less than those required for conversion of ester to acetal in a single stage. These vinyl resins retain acid and excess aldehyde tenaciously, and stabilizing is difficult; hence sequential conversion is attractive for products of high resistance to weathering.

Chemical Structure

The first polyvinyl acetals were apparently made without full recognition of their identity, by polymerization of vinyl acetate containing acetaldehyde. Regardless of choice of aldehyde, the product from a single-stage synthesis is so soft as to be of value only in adhesive or varnish applications. As pointed out in discussion on zinc dehalogenation of vinyl chloride (Part I of this article), if the outermost pairs of five successive chlorines are removed, the third or central chlorine cannot be removed for spatial reasons. Similarly, it is impossible to remove all hydroxyls of polyvinyl alcohol by pairing with an aldehyde. Theory would show that 13% of the number of hydroxyls cannot be removed:



Although the vinyl acetals are used as substitutes for rubber, their hydroxyl content is such that—except under special circumstances—there is always to be expected a sensitivity to water or alcohols which is not encountered in hydrocarbon types of substitutes. Due to hydroxyls in the acetal resins, they actually show a resistance to hydrocarbon solvents which is not available except in rigid highly vulcanized natural or synthetic rubbers. Solvent resistance and compatibility of polyvinyl acetals with other resins or plasticizers can be adjusted over wide ranges and are dependent on:

(1) choice of acid for initial vinyl esterification
(2) molecular weights of polyvinyl ester
(3) degree of hydrolysis
(4) degree of acetalization for any given hydrolysis product
(5) choice of aldehyde or several aldehydes for a single condensation
(6) after-treatment, as plasticizing or cross-linking

Polyvinyl Formal

Polyvinyl formal may be prepared from an aqueous solution of polyvinyl alcohol and formaldehyde; the resin precipitates from water as the reaction proceeds. By that procedure it is difficult to reduce the hydroxyl content to the point where the resin is not objectionably water sensitive. Polyvinyl formal may also be made by reacting formalin or paraform with alcoholic solutions of polyvinyl acetate.[8, 9, 31, 47]

Polyvinyl formal has been proposed for lamination of safety glass[8, 32, 48, 49] and plywood.[32] Composition can be varied, but the following data apply to a formal used for bonding plywood aircraft propellers[3]:

specific gravity	1.34
tensile strength	15,700 lb./sq. in.
compressive strength	21,000 lb./sq. in.
modulus	4 x 10^6

These laminated propellers, called Hydulignum, are reported to have such uniform density as to be completely interchangeable; and to have such strength that root diameter of blade may be less than for duralumin or steel. Although seriously considered, the formal was not commercially produced for safety glass in this country because of cold brittleness, probable need of edge-sealing to keep water from weakening the bond, and the greater bonding strength of polyvinyl butyral.

Formals of high degree of acetalization are soluble only in dioxan, acetic acid, and chlorinated solvents. Methyl acetate is a poor solvent, and the product resists alcohols, glycols and benzene. Moisture transmission is one-tenth that of regenerated viscose foils and one-fourth that of cellulose acetate.

Because of solvent resistance, polyvinyl formal has been used for tubing lines to carry aromatic fuel. Large quantities of polyvinyl formal are used for insulation of wire which must have hard, flexible coating, as magnet wire. Some has been used for transparent belts and suspenders, because it is less sticky when plasticized than other vinyl acetals.

Polyvinyl Acetal

As suggested above, these were the first of the condensation products of polyvinyl alcohol and aldehydes,[31, 47] the products being used instead of ester gum in varnishes.[10, 50] Compositions have been made for injection molding at temperatures about 190° C. and these have been used for combs because of their toughness. Both as molding composition and as lacquer for fiber backing, the acetal has been used for phonograph records.

When 75 per cent of the acetate groups of polyvinyl acetate have been replaced by acetalization (and a very small number of hydroxyl groups has been formed), the softening point is 50° C. higher than that of initial polyvinyl acetate. The solution viscosity is doubled, and tendency to cold flow is somewhat reduced.

Polyvinyl Butyral

The resin from polyvinyl alcohol—prepared by essentially complete alcoholysis of polyvinyl acetate of medium viscosity—and normal butyraldehyde is the polyvinyl acetal of largest commercial production. Polyvinyl butyral was first devised for lamination of safety glass.[51] Free hydroxyls are essential for good bonding.[48] Best results are reported with a polyvinyl alcohol of vinyl acetate content less than 3 per cent and having 54 to 78 per cent of its hydroxyls acetalized.*

Automobile safety glass comprises two pieces of plate glass bonded with heat and pressure to a plasticized sheet of butyral about 0.015 inch thick. Plasticizer usually comprises 25 to 30 per cent of the weight of butyral safety glass sheeting. Although this interlayer is thinner than the cellulose acetate which it replaces, it provides better protection at all temperatures, and is far superior at low temperatures. Butyral is more light-stable than either cellulose nitrate or cellulose acetate, which it completely replaced in American automobile windshields and side panels. Unlike cellulose acetate, it does not require edge-sealing to prevent moisture from weakening the bond or rendering the interlayer opaque.

Because equipment was designed for manufacture of safety glass type of polyvinyl butyral, there has been little opportunity for preparing other widely different types. Recently a butyral with about half the hydroxyl content of safety glass resin has been offered for fabric-proofing and adhesive applications. It shows greater compatibility with other resins and plasticizers. The data in Table II are for unplasticized sheeting, a representative flexible film for safety glass lamination, and a representative cross-linked composition of polyvinyl butyral.

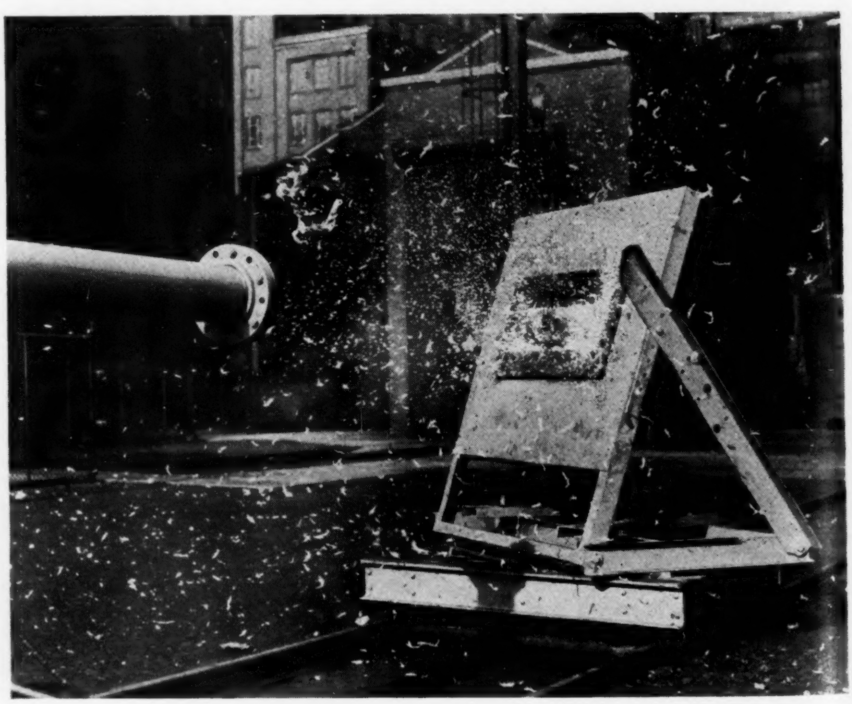
With the threat of aerial attack on our cities and factories, interest has been aroused in means for shatterproofing glass. Polyvinyl butyral has been proved one of the best resins on which to base shatterproofing lacquers, cemented sheets, or adhesive-coated fabrics to be applied to window panes. Large quantities of butyral sheet are being used for military safety glass.

Because it is easily worked, polyvinyl butyral was instrumental in the development of modern plywood molding processes. Strong adhesion is secured with a permanently thermoplastic composition, the plywood assembly being bonded under heat and pressure, with cooling prior to removal from the press. These compositions have the advantage that if there is slippage of plies during molding, the assembly may be resoftened and remolded. Thermosetting adhesives would necessitate scrapping of the part. Compared with glues based on water-soluble thermosetting resins, butyrals are quite expensive. The thermoplastic characteristic and relative water sensitivity are detriments. Compositions with thermosetting characteristics have recently been devised and show promise where there is vibration or flexural fatigue of the plywood assembly which may rupture a rigid bond.

Butyral resins show such good adhesion as to be interesting as bases for lacquers, although weathering resistance is so low that applications are few. One of the most striking of these is the blowing of resin through a flame-spray pistol, laying down a film of resin without solvent. The apparatus is an unmodified Schori pistol such as is used for spraying metal powders.

Several years ago, experimentation was undertaken to develop waterproof and gasproof fabric coatings based on polyvinyl butyral instead of rubber. Work was promising, but while natural rubber was available at lower prices the program was not carried far. A material so resilient as plasticized butyral is a natural replacement for rubber, and wholly new uses for butyral have been developed by all resin suppliers for important war pro-

Polyvinyl resins are now being used in bird-proof windshields to cut down the hazard to fast flying airplanes. This photograph shows a four-pound fowl being hurled against a du Pont test assembly at a velocity of 110 miles per hr.



duction. Compositions for fabric proofing, extruded tubing and new adhesive needs, to name a few, have proved superior. They will continue to serve in some applications even when cheaper natural rubber and synthetic rubber formulations are available.

During the spring of 1942, butyral was explored for many uses as a rubber substitute, since the resin was not then under priority. The highly thermoplastic nature and stickiness of mixtures of plasticizer and resin were a bar to success in many of these applications, and little or no butyral is now being molded in place of rubber. A more important bar than shortcomings of the resin was the fact that military applications of the resin for proofing fabrics necessitated putting butyral on complete allocation in October, 1942.

Army Quartermaster Depots have pioneered new materials for proofing of fabrics. To augment supply of vinyl copolymer resins, fabric coaters were encouraged to supply polyvinyl butyral coatings. Butyral now saves 1¾ pounds of rubber on each of millions of Army raincoats. At first these were compounded simply of butyral, plasticizers and pigments. They possessed marked advantages over formulations based on polyvinyl chloride-acetate, for they could be milled on regular rubber equipment and handled on simple pyroxylin spreaders or rubber calenders. Preparation of knife coatings and cementing of seams was easy, because ethanol-butanol mixtures were effective solvents and the resin itself is an excellent adhesive. However, the thermoplastic characteristics of butyral were such that even the best of these coating compositions was on the borderline of rejection because of blocking at high temperatures.

Table II—Physical Properties of Some Compositions of Polyvinyl Butyral

	Rigid Unplasticized	Safety-glass Sheet	Cross-linked
Specific gravity	1.18	1.05	1.05–1.20
Tensile strength, lb./sq. in.	8300	2000	500–3500
Elongation	——	250	150–450%
Impact, Izod	0.8–1.2	because of rubbery quality, this value cannot be determined	
Resistance to heat (continuous)	115°		140° F but fabric proofing from similar compositions is not tacky at 260° F.
Effect of age	none	none	none
Sunlight	slight	slight	slight
Weak acid	attacked	attacked	slight
Weak alkalis	very slight	slight	resistant
Strong alkalis	slight	slight	resistant
Organic solvents	(soluble in ketones, esters, alcohols, aromatic and chlorinated hydrocarbons; resists oils and aliphatics)		better than uncrosslinked.
Clarity	transparent	transparent	translucent
Color possibilities	unlimited	unlimited	unlimited

As has been indicated under polyvinyl alcohol, compounding of polyvinyl butyral with thermosetting resins leads to reduction in solubility and in thermoplasticity. Such compositions were explored for moldings and have been adopted for fabric proofing. The aim is to prepare fabric compositions which show less stickiness at high temperatures, improve seam strength, and offer greater resistance to solvents.

Depending on choice of components, effective insolubilizing can be secured by amounts of modifier as small as 5% of the weight of butyral. Choice of plasticizer must be made more carefully than for thermoplastic butyral, since complete linking may "wring out" plasticizer or solvent. Insolubilizing has also been called "thermosetting," "curing," "vulcanizing," or "cross-linking." Products can be made which do not soften below temperatures at which they char. Development of satisfactory insolubilized compositions will depend on nature of article to be made, equipment and technique for coating, and method of assembly of coated fabric into garment. For these reasons it is difficult to make general recommendations of formulas, and many fabric proofers have devised their own compositions. Usual practice is to coat cloth; remove solvent at 140° F.; fabricate garment by stitching and cementing; heat assembled garments at 250° F. from one to two hours to "cure" the coating, and "vulcanize" the cemented joints.

Rubber is replaced in army raincoats by tough, resilient vinyl plastics. This particular coat was made with Monsanto's Saflex, a polyvinyl butyral. It is lighter than rubberized coats and saves about 1¾ pounds of crude rubber.

These compositions are going into Army raincoats, Marine ponchos and the like, as is also vinylchloride-acetate copolymer. For hospital sheeting, the ability to endure steam sterilization without becoming sticky recommends these butyrals over vinyl chloride-acetate. Freedom from odor makes them preferable to natural or synthetic rubbers.

Insolubilized butyral is being used for fuel and oil lines as a replacement for flexible copper tubing. Solvent resistance approaches that of polyvinyl alcohol, and water resistance is excellent.

Vinylidene Chloride

Unsymmetrical dichlorethylene, commonly called vinylidene chloride, was reported as early as 1838 by Regnault,[48] but was rarely in chemical literature until its polymers were studied in 1930 by Staudinger and Feisst.[67] These authors proved the structure to be that of a head-to-tail polymer, with unusual tendency toward crystallinity.

$$\begin{array}{ccccccccccccc} & H & & Cl & & H & & Cl & & H & & Cl & \\ - & C & - & C & - & C & - & C & - & C & - & C & - \\ & H & & Cl & & H & & Cl & & H & & Cl & \end{array}$$

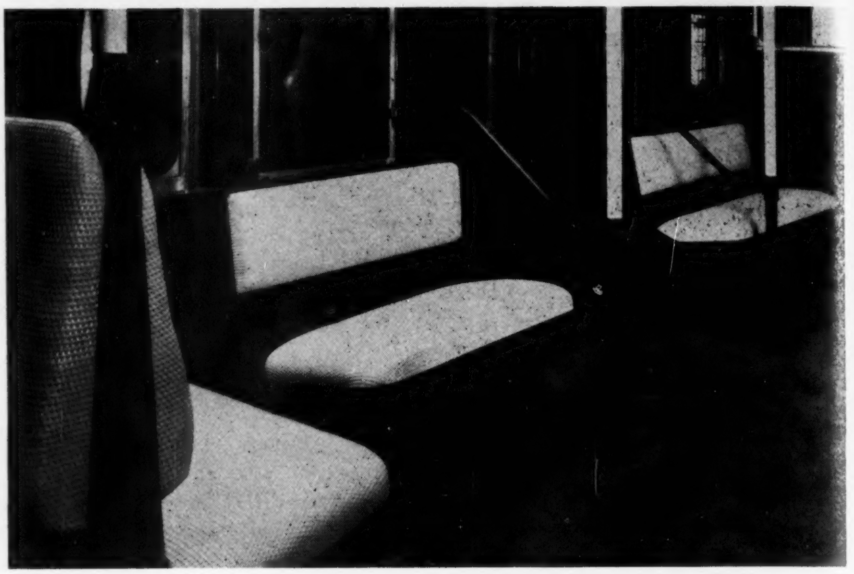
After a decade of research, the Dow Chemical Company in 1940 introduced

polymeric vinylidene chloride under the trade name "Saran." In August, 1942, the name was released as a generic term for polymers and copolymers of this monomer. The monomer boils at 31.7° C., and is made by the following sequence of reactions.[8]

$$\underset{\text{ethylene}}{H_2C{=}CH_2} \xrightarrow{Cl_2} \underset{\text{trichlorethane}}{\overset{Cl\ \ Cl}{\underset{H\ \ Cl}{HC{-}CH}}} \xrightarrow{CaO} \underset{\text{vinylidene chloride}}{H_2C{=}CCl_2}$$

The material studied by Staudinger[67] was a by-product of I. G. Farbenindustrie manufacture of trichloroethylene. Polymers (and copolymers with vinyl chloride or vinyl acetate) can be formed with softening points ranging from 70° C. to 180° C. These vary from soft and flexible to hard and rigid products. Those commercially produced are in the middle of that range.

As reported at the 1941 meeting of the American Chemical Society,[25] X-ray and other studies show that vinylidene chloride polymers have regions of crystalline structure. When injection molded into a cold die, the material is not so rigid as are other thermoplastics, whose molding cycle can be shortened appreciably by use of colder molds. Ordinarily with thermoplastics a limit to speed of injection molding cycles is the rate at which castings become rigid enough to remove from the cavity. For most materials the cycle can be shortened by use of colder dies. In molding of vinylidene chloride this is not always the best procedure, since the crystalline form is more rigid than the amorphous, and rate of transformation from amorphous injected form to crystalline state is higher at higher temperatures of molds. Therefore, the best mold temperature is one low enough for initial solidification and yet high enough to accelerate crystallization.



Tough abrasion-resistant saran filaments are used for covering subway seats.

Among vinyl polymers, those from vinylidene chloride have enhanced susceptibility to orientation. By cold-working, extruded fibers can be drawn to several times their original length. The tensile strength then rises from 10,000 to 60,000 pounds per square inch when measured along axis of drawing.

The excellent chemical resistance of saran formulations makes them useful for chemical equipment, as coatings and as tubing. Saran is employed in dippers for concentrated nitric and sulfuric acids, although it is darkened by the latter and attacked by warm aqua ammonia. For resistance to lacquer solvents, saran has been used in spray-gun parts. Much has been used in place of copper tubing for domestic hot and cold water lines, and regular pipe fittings are injection molded for this use. The oriented tubing has high flex resistance and finds use for engine supply lines. Oriented filaments, under the trade name, "Vec," have found acceptance as fishing leaders and snells, and under the name, "Velon," as upholstery fibers. Subway car seats of saran filaments are resistant to abrasion.

Polyvinylidene chloride is greatly embrittled by subjection to low temperatures. Copolymerization, as with vinyl chloride or vinyl acetate, is employed to reduce this brittleness. These copolymers are also referred to as saran.

Like polyvinyl chloride, polyvinylidene

Piping made from saran, a polyvinylidene chloride plastic is easily handled. This photograph shows it being threaded on standard pipe threading equipment.

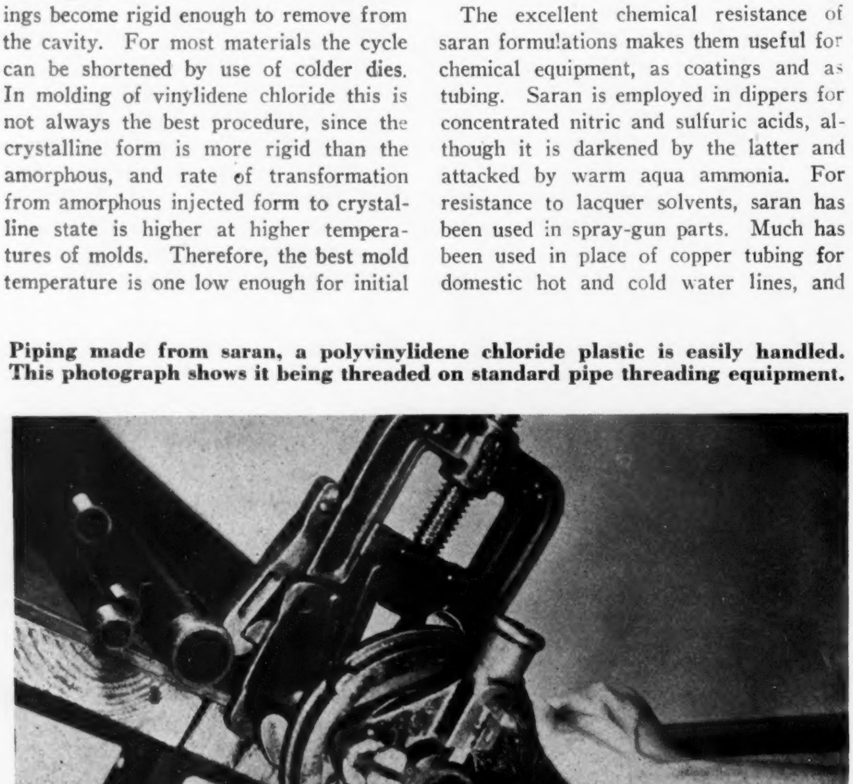


Table III—Physical Properties of Saran[25, 26]

Specific gravity	1.6 to 1.75
Refractive index	1.60 to 1.63
Tensile strength unoriented	8,000 p.s.i.
Tensile strength oriented	60,000 p.s.i.
Elongation	25%
Modulus of elasticity	0.4 to 2.4 x 10^5 p.s.i.
Flexural strength	15,000 p.s.i.
Impact strength	1 to 4 ft. lb./in. notch
Hardness, Rockwell superficial 15y	65 to 95
Resistance to heat, continuous	70° to 95° C.
Softening point	95° to 165° C
Burning rate	none
Volume resistivity	6 x 10^{13} ohm-cm.
Breakdown voltage 60 cycle	500–2,500 volts/mil. instantaneous
Dielectric constant 66, 10^3, 10^6 cycles	3 to 5
Power factor 60 cycles	0.03 to .08
Power factor 10^3 cycles	.03 to .15
Power factor 10^6 cycles	0.3 to .05
Water absorption 24 hr. immersion	0.0%
Effect of	
age	none
weak acids	none
strong acids	none
weak alkalis	none
strong alkalis	very slight
sunlite	very slight
organic solvents	highly resistant
Effect on metal inserts*	none
Clarity	transparent to opaque
Color possibilities	unlimited

* Iron and copper catalyze removal of hydrogen chloride from vinylidene chloride, hence injection equipment for this material should be chrome-plated; this is to protect equipment from corrosion and to give stable products.

chloride discolors on prolonged exposure to sunlight. Presumably the mechanism is the same, for similar stabilizers are effective.

Miscellaneous

Various resins may be obtained from the vinyl monomers by polymerizing with other materials. Wagner-Jauregg[72] applied the term "heteropolymer" to products made by copolymerizing a material which alone does not polymerize. This term implies a structure or behavior different from other copolymers, but there is no difference.

Carbozole can be made to react with acetylene, to give N-vinyl carbazole.[73] The product is used in injection molding compositions, but apparently only in copolymers.

Vinyl ethyl ether can be made by addition of acetylene to ethyl alcohol, or by removal of a molecule of alcohol from ethyl acetal.[74] The monomer is copolymerized with acrylonitrile to give materials for coating leather and fabrics.

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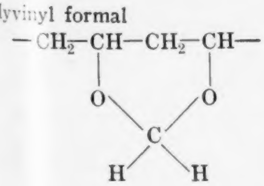
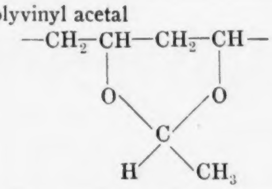
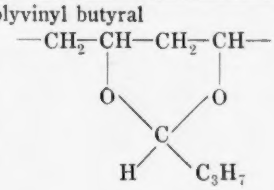
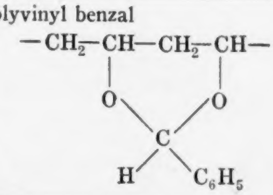
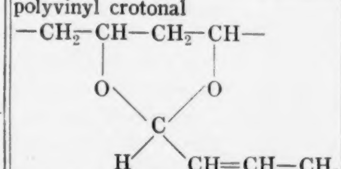
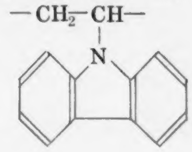
Table of Trade Names of Vinyl Plastics

Chemical Identity	Trade Name	Proprietor, but not necessarily manufacturer
polyvinyl chloride $-CH_2-CHCl-$	Decilith Igelite P. C. Faser P C U Mipolam Vinidur Flamenol Kogene Korogel Korolac Koroseal Vinylite Q	I. G. Farbenindustrie I. G. Farbenindustrie I. G. Farbenindustrie I. G. Farbenindustrie I. G. Farbenindustrie I. G. Farbenindustrie General Electric B. F. Goodrich B. F. Goodrich B. F. Goodrich B. F. Goodrich Carbide & Carbon
polyvinyl acetate $-CH_2-CH(OCOCH_3)-$	Gelva Mowilite Mowilith P. V. Acetate Vinylite A	{ Shawinigan Products, Monsanto I. G. Farbenindustrie I. G. Farbenindustrie Du Pont Carbide & Carbon
polyvinyl chloride copolymers—with vinyl acetate $-CH_2-CHCl-CH_2-$ $CH(OCOH_3)-$	Cotacord Cotatape Elasti-Glass Resovin Tygon Vinylite V Vinylseal Vinyon	Freydberg Bros.—Straus, Inc. Freydberg Bros.—Straus, Inc. S. Buchsbaum S. S. White Dental Mfg. U. S. Stoneware Carbide & Carbon Carbide & Carbon Carbide & Carbon
polyvinylidene chloride $-CH_2-CCl_2-$	Apla Mills Plastic Saran Vec Velon	Allied Plastics Elmer E. Mills Dow (name released as generic) Pierce Plastic Co. Firestone Tire & Rubber
polyvinyl alcohol $-CH_2-CH(OH)-$	P V A Silberschlauch Solvar	Du Pont I. G. Farbenindustrie Shawinigan Products
polyvinyl formal 	Formex Formvar	General Electric { Shawinigan Products, Monsanto

Chemical Identity	Trade Name	Proprietor, but not necessarily manufacturer
polyvinyl acetal 	Alvar	{ Shawinigan Products, Monsanto
polyvinyl butyral 	Butacite Butvar Flexseal Heydenite Heydenite X Horco X Saflex Saflex T S Vinal Vinylite X	Du Pont { Shawinigan Products, Monsanto Pittsburgh Plate Glass (for safety glass) Stanley Chemical Co. Stanley Chemical Co. (crosslinking) Hodgman Rubber Co. (crosslinking) Monsanto Monsanto (crosslinking) Carbide & Carbon (for safety glass) Carbide & Carbon
polyvinyl benzal 	Benvar	Shawinigan Products
polyvinyl crotonal 	Crotvar	Shawinigan Products
polyvinyl ethyl ether $-CH_2-CH(OC_2H_5)-$	Lutonal	I. G. Farbenindustrie
poly—N—vinyl carbazole 	Luvican	I. G. Farbenindustrie

Speakers' table at the subscription banquet. Left to right: Mrs. Per K. Frolich, Major William P. Putnam, Fowler V. Harper, Harvey M. Merker, Per K. Frolich, Mrs. Ralph D. Hummel, Thomas Midgley, Jr., and Charles F. Parsons.

Manpower and Molecules Share ACS War Spotlight

Chemical industry must use more women, says WMC deputy. Plan to insure replacements of chemists and chemical engineers for industry promised soon. Thomas reviews chemical contributions to war. Keyes describes OPRD functions. Murphree reviews petroleum in the war.

THOUGH not evident from the program, the knotty problem of manpower shared honors with more inanimate things as top subjects of discussion among 3,800 American chemists and chemical engineers gathered in war-crowded Detroit last month for the 105th meeting of the American Chemical Society. Specifically designated a war session, the entire meeting was conducted on a serious note and despite wartime censorship, provided much evidence that the nation's chemical brains are very definitely on the job in the present emergency. Indicative of the interest shown in the meeting was the fact that emergency housing accommodations as far away as Windsor, Ont., and Mt. Clemens, Mich., did not deter registrants so located from faithful attendance at technical sessions. The Rubber Division program was especially well attended. The 1,100 to 1,200 present at its Thursday meeting is believed to be the largest attendance at a divisional technical session in the history of the society.

The manpower problem, which found expression primarily in corridor discussions and across luncheon and dinner tables, was brought out in the open in climactic fashion by Fowler V. Harper, deputy chairman of the War Manpower Commission, in his address at the main banquet session.

"American industry is going to have to give up its able-bodied men to the armed services," Mr. Harper said. He pointed out that there are 22,000,000 men in the United States between the ages of 18 and 38. Of these, 8,000,000 are physically or mentally unfit, 11,000,000 will be needed for the services, and 1,500,000 must be kept on the farms. This leaves 1,500,000 for all other civilian work, including war industry.

Chemists To Be Protected

"Chemists, physicists and other gifted individuals will constitute part of that 1½ million," Mr. Harper said. "The War Manpower Commission will continue to take utmost care to protect the available supply of chemists and other necessary scientifically trained war workers. We expect soon to announce plans to insure adequate replacements," he said, but added that industry will have to use more women chemists and chemical engineers.

Mr. Harper revealed that during March of this year the United States Employment Service completed the most extensive survey of the shortages in critical professional and technical personnel yet attempted. The survey is said to cover the needs of some 16,000 establishments and the results are expected to be made available shortly.

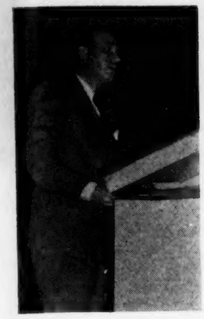
He also said that a recent more limited survey by the United States Employment Service showing current employment and anticipated hires of 526 companies, indicated that during 1943 these companies would require 38.8% more biological chemists, 32.6% more organic chemists, 32.6% more inorganic and physical chemists, 51.9% more metallurgists, and 32.6% more chemical engineers, all based on employment at the beginning of the year.

"There is also a decided shortage in available laboratory technicians and chemical assistants. The best available data

show a need for 78.2% additional employees of this kind."

Enumerating some of the things that must be done to meet the situation, he said, "People should work as near their homes as possible. Employers must exhaust the local labor supply before looking elsewhere for workers. This Government cannot afford to transport a single worker into an area where a single worker is available to perform the job."

Mr. Harper estimated that if employees could be educated to avoid needless migration and absenteeism, we would gain the equivalent of 2,000,000 men added to our labor forces.



C. A. Thomas

The "demon" of insufficient manpower was given added emphasis by Dr. Charles Allen Thomas, central research director of Monsanto Chemical Company, who addressed the general session on the subject "Chemical Industry in the War Effort." Three "demons," Dr. Thomas said, have attempted to impede the progress of the war effort: the demon of inadequate production facilities; the demon of insufficient raw materials, and the demon of manpower shortage. "Inadequate production facilities we tackled by building on a gigantic scale," Dr. Thomas pointed out. "Insufficient war materials we have brushed aside by the use of alternates. But decreasing supply of manpower could not be so easily dealt with. The demon of manpower shortage promises to become even more troublesome in our continued progress.

"The entire war program has required, and will continue to require, more chemicals than this country of ours ever had to produce. At the same time we are faced with the fact that we have fewer chemists per capita than do some of the enemy countries.

"For example, based on a ratio of chemists to population, Germany has three times as many chemists as the United States. I believe that in this country there are approximately five chemists per 10,000 population, while in Germany there are 15 chemists per 10,000. Nevertheless, the chemical industry has so far successfully handled the job of supplying materials with comparatively few shortages."

Stressing the important role of the scientist in preparing for post-war reconstruction and the winning of the peace, Dr. Thomas said, "Regardless of the political or social complexion of the post-war world, it is still up to the chemist, the physicist and the engineer to supply the new things which will create new jobs for the returning men.

"A small number of technical men may bring about the employment of thousands of people. Five thousand research workers may create jobs for millions. I like to look on the research worker as a catalyst in the heterogeneous reactions of society. Is it wise to put all our catalysts in uniform, so to speak? Five thousand scientists, or potential scientists, under arms can do no more than five thousand other men—a very small group as our armed forces go today—but five thousand scientists if working on new developments may create jobs for millions of returning soldiers."

Chemistry at War

Those who have put in many long and weary hours on some chemical project of the war program will find satisfaction and encouragement in Dr. Thomas' account of the contributions of the industry to the war effort. Accomplishments to date, however, can be regarded as no more than a forerunner to what will be required to realize the smashing United Nations' victory that will end the conflict, and to which we must yet strive.

C. F. Kettering

Charles F. Kettering, vice-president of General Motors Corp., addressed the general session on the automotive industry in the war effort. He said the periodic redesigning and retooling that has always characterized the industry made conversion to war production relatively easy. He estimated that, in World War 1, the industry had furnished the average army division with motor vehicles representing 3,500 horsepower. The modern motorized division, he said, was using 450,000 horsepower.

E. V. Murphree, Standard Oil Development Co., who spoke on war developments in the petroleum industry, listed as the most important war contributions of the industry the production of synthetic toluene, the production of large quantities of high octane aviation gasoline, and the production of synthetic rubber raw materials. The following, ac-

Above: Entrance to Horace H. Rackham Educational Memorial, imposing new home of the Engineering Society of Detroit, Detroit Branch of the University of Michigan Extension Service, and Institute of Public and Social Administration.

Right: D. B. Keyes, chief, Chemical Industry Branch of the Office of Production Research and Development of WPB; Harvey M. Merker of Parke-Davis, general chairman of the meeting; and Major W. P. Putnam of Detroit Testing Laboratories, honorary chairman.

E. V. Murphree

cording to Mr. Murphree, is how everything but the proverbial smell can be taken out of a barrel of crude oil in a form that can be put to some war use:

"The C4 fraction may be converted into aviation gasoline through the alkylation process using fractionation or isomerization or both. As an alternate, the butane fraction after separation of isobutane can be catalytically dehydrogenated by successive steps to give butadiene. The C5, C6 and C7 to 200° F. fractions may be either used directly in aviation gasoline or, as an alternate, selected fractions of these cuts may be isolated by superfractionation and then used in aviation gasoline. The low octane number fractions discarded in the superfractionation may be isomerized if desired into higher octane number fractions. The fraction boiling from 200 to 290° F. contains most of the potential as well as the actual C7 and C8 aromatic compounds such as toluene and xylenes. This fraction is preferably processed by hydroforming to convert potential aromatics into actual aromatics. The hydroformed material may be used either directly in aviation gasoline, or the aromatics isolated by extraction. The heavy naphtha boiling from 290 to 350° F. can be subjected to severe thermal cracking or reforming to yield butadiene directly and other desirable materials. As an alternate, this fraction may be hydroformed. The gas oil fraction boiling from 350° F. to crude bottoms is best processed by catalytic cracking to yield aviation gasoline and raw materials for synthetic rubber. As an alternate the lighter portion of this fraction can be subjected to severe thermal cracking to yield butadiene and other desirable products. The crude bottoms can be utilized in fuel oil."

Functions of OPRD

Those attending the Industrial and Engineering Chemistry divisional luncheon heard Donald B. Keyes, chief of the chemical industries branch of the Office of Production Research and Development, describe the duties and operations of this office, which was organized only a few months ago at the request of Donald Nelson as the scientific and engineering unit of WPB.

"There has been a great need from the very start of the war for the development of new and improved methods of producing raw materials and intermediates that go into the manufacture of weapons and essential war machinery. This work has been done almost entirely by industry itself, and it has done an excellent job. However, as the war has progressed, it has become apparent to the War Production Board that this work in industry and in various public and private laboratories should be further coordinated and aided so that the use of results might be more prompt and more effective in the war program. This was the real reason for the formation of OPRD.

"The functions of this office can best be stated by repeating what was officially announced at the time of its formation:

In general terms, the Office of Production Research and Development will have four principal functions. They are:

1. To provide the Chairman of the War Production Board with technical information on problems with which he is directly concerned and on research and development work now in progress in the War Production Board, and also any organizations connected even indirectly therewith. The office is also to provide the War Production Board divisions and branches with research information and findings on work which they have in progress.

2. To initiate evaluation and analysis of specific scientific or technological proposals through the establishment of expert committees or through reference to existing research groups in government, education or industry.

3. To get needed research accomplished by contracting with outside laboratories or agencies for experimental work.

4. To bring about development of such projects or processes as are found to merit it through contracting for the construction of prototypes or the erection of pilot plants.

"The main function of the Chemical Industries Branch of OPRD is to evaluate chemical developments and make recommendations as to the allocation of OPRD funds or the giving of necessary priorities by WPB for specific projects. The requests for these evaluations and recommendations come largely from the Chemicals and other divisions of WPB. But the Chemical Industries Branch also considers requests of this same nature from other governmental organizations, such as the Defense Plant Corporation and the Smaller War Plants Corporation and technical groups of the armed services. Some projects come even from individuals and industrial concerns who believe that they have ideas worthy of development, but do not have the necessary backing to obtain funds for pilot plant construction or priorities for necessary equipment.

"The many people who wish to assist and cooperate with OPRD should not *ask* us how they can help; they should *tell* OPRD. Before submission of definite proposals, they should be reviewed from the governmental viewpoint to be sure they meet requirements and that all obvious questions are answered. OPRD is willing and anxious to review any proposal that survives such review, and to help in any way it can to see that worthwhile developments are carried to a successful conclusion.

"The present excellent cooperation between OPRD, the chemical industries and the various research laboratories in this country may be expected to continue and grow. Please remember that the chief function of OPRD is to expedite *your* ideas, because *you* are the ones who have the ideas of value during these days. You should consider OPRD as your personal agent representing you in Washington."

Following are abstracts of some of the papers presented at technical sessions of the meeting:

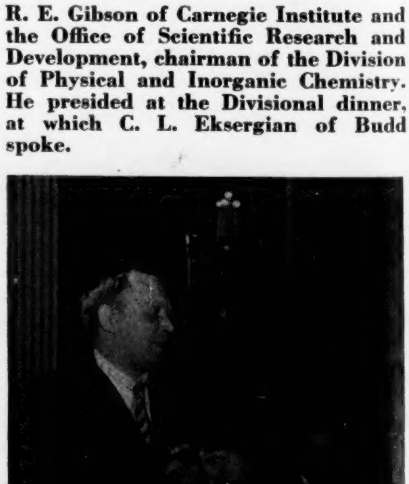
Hydrolysis of Titanium Sulfate Solutions

Paper presented by Arthur W. Hixson, Columbia University.

Research carried on by Dr. Hixson, professor of chemical engineering at Columbia, and Dr. Ralph E. C. Frederickson of the Staley Manufacturing Company, Decatur, Ill., has solved the problem of titanium sulfate hydrolysis by the use of absorption spectra on titanium sulfate solutions of varying compositions under carefully controlled conditions. By determining the amount of light absorption under the governing conditions in each case, methods of control were discovered that will enable the manufacturer to select the proper hydrolysis condition to produce pigment with the properties that he desires.

One of the mysteries of titanium pigment manufacture was the mechanism of the reactions that take place when titanium sulfate solutions are hydrolized to pro-

R. E. Gibson of Carnegie Institute and the Office of Scientific Research and Development, chairman of the Division of Physical and Inorganic Chemistry. He presided at the Divisional dinner, at which C. L. Eksergian of Budd spoke.



duce titanium oxide. This step entailed much trial and error work to obtain a satisfactory pigment, and upon it depended the purity and essential physical properties of titanium oxide. Titanium sulfate solution, although it has been used heretofore in titanium pigment manufacture, now can be used scientifically. The new method of control will tell the manufacturer "what goes on" in the important step.

The report also cited the importance of titanium oxides as a filler in the manufacture of rubber and plastic products.

Catalytic Cracking by the Fluid Catalyst Process

Paper presented by E. V. Murphree, vice-president, Standard Oil Development Co., N. Y. C.; C. L. Brown, Standard Oil Co. of Louisiana, Baton Rouge, La.; and H. G. M. Fischer, E. J. Gohr, and W. J. Sweeney, Standard Oil Co. of New Jersey.

Fluid catalyst process represents a new means of carrying out catalysis on an industrial scale. The catalyst is used in the form of a powder and is so handled that it can be made to flow like a fluid, thus permitting circulation of large amounts of catalyst through the equipment without use of any moving parts.

Catalytic cracking by the fluid catalyst process is being applied to produce a large part of the country's requirements for 100 octane aviation gasoline and synthetic rubber raw materials. With this process very high yields of high quality aviation gasoline can be obtained. From a paraffinic gas oil 57% of aviation gasoline can be produced of considerably higher octane number than present requirements. Due to the high quality it is possible to blend the catalytic gasoline with gasoline from crude, which in itself is not of sufficiently high octane number, to produce 78% (based on the original gas oil charged) of 100 octane gasoline. The fluid catalyst process produces large quantities of butylenes which are raw materials for manufacture of synthetic rubber.

The principles of the fluid catalyst process have wide application outside the oil industry. These principles represent in their broadest aspect new industrial methods of handling solids and of controlling temperatures for gases or vapor reactions. The advantages in temperature control and ease of handling offered by the fluid catalyst type of operation may have application to low temperature carbonization of coal, to coal liquification, reduction of iron ore, and the roasting and smelting of various ores. Experimental work has indicated that excellent temperature control can be obtained through use of these principles in oxidation of organic compounds, and particularly for the production of phthalic anhydride from naphthalene.

Derivatives of Biphenylsulfonamide-1. Preparation of p-(c-Aminophenyl)-Benzenesulfonamide

Paper presented by Alexander H. Popkin, General Printing Corp., N. Y. C.

The authors of these papers have attacked this problem from two angles; first, to utilize an available raw material which was not being used in the war effort, and secondly, to make from this available material new chemical compounds which might be valuable in combating diseases and infections resulting from the war.

The presently used "sulfa" drugs have an amino group and a sulfonamido group attached to a benzene nucleus in definite fixed positions. The new compounds described by the authors of the papers are chemical materials in which an amino group and a sulfonamido group are attached to a biphenyl nucleus.

In a manner analogous to the "sulfa" drugs, the sulfanamido group attached to biphenyl has been modified by chemically combining it with compounds which were known to have an effect upon the activity of the "sulfa" drug. A series of twenty-four new chemical compounds resulted which resemble the "sulfa" drugs only remotely in their chemical structure. However, from a theoretical point of view, they appear to have interesting possibilities in applications similar to those in which "sulfa" drugs now are employed. Pharmaceutical testing of these new compounds indicates that these materials are ineffective in combating cocci infections, as contrasted to the "sulfa" drugs.

The Chemistry and Development of Atabrine and Plasmoquin

Paper presented by A. E. Sherndal, Winthrop Chemical Co., Inc.

In the fight against malaria, atabrine and plasmoquin are the two drugs upon which the United Nations are now almost entirely dependent. Of these, atabrine is the more important because of its wider scope of action in the malaria cycle.

The loss of the antimalarial value of quinine has been more than compensated for by American production of atabrine. Amount of quinine available for malaria therapy before the war was estimated to be sufficient to treat 50,000,000 cases a year. Present production of atabrine in this country far exceeds the rate of 800,000,000 tablets per year (sufficient for 53,000,000 cases) announced last December. With the constant widening of our field of military operations and the increasing populations whose health we are being called on to protect, the production goal for atabrine in the United States is now set at twice current production. This is conclusive evidence of the extreme importance of this product to our war effort.

Stability of Butadiene

Paper presented by Richard F. Robey, Herbert K. Wiese and Charles E. Morrell, Esso Labs., Standard Oil Development Co., Elizabeth, N. J.

The urgency for the expansion of synthetic rubber production has associated

Left to right. Charles L. Gabriel, Publicker Commercial Alcohol Co., who presided at the Symposium on Solvents; E. W. McGovern, E. I. du Pont de Nemours & Co. delivering his paper on "The Chlorohydrocarbon Solvents"; Grant W. Smith of B. F. Goodrich Co., W. A. Henson of Dow Chemical Co., and Richard W. Quarles of Mellon Institute and Carbide and Carbon Chemicals Corp. discussing Dr. Quarles' paper, "The Role of Ketones as Solvents for the Vinyl Resins"; A. K. Doolittle, Carbide & Carbon Chemicals Corp., presenting his paper, "A Suggested Mechanism of Solvent Action"; and Ralph L. Ericsson, Commercial Solvents Corp., who presented a paper, "Solvent Uses of the Nitroparaffins."

with it a considerable number of problems for the chemist, not the least of which is the storage and handling of rubber raw materials. Butadiene, one of the most important rubber raw materials, presents certain difficulties in this connection. Like many products with which the general public is more familiar, butadiene tends to undergo certain undesirable chemical changes if not stored properly.

The authors studied the behavior of butadiene under a variety of conditions and obtained information from which the optimum conditions for handling of butadiene can be ascertained. The mechanism whereby the oily substance, known as the cyclic dimer of butadiene, is formed is independent of that of the sticky substance, butadiene high polymer. The cyclic dimer was found not to be an intermediate in the formation of the high polymer.

The formation of high polymers is catalyzed by oxidation of the butadiene, usually resulting from contact with air, but may be inhibited by adding certain "anticatalysts" to the butadiene. The formation of butadiene dimer is unaffected by the anticatalysts, but refrigeration is beneficial.

Fiber Cans as Alternates for Metal Containers

Paper presented by R. P. Bigger, American Can Company.

Wartime restrictions on the use of metals have been responsible for many changes in the packing industry. Manufacturers and users of containers have had to look for less critical materials as packaging media, and in many cases have found satisfactory substitutes in paper and paper products.

Paper and paperboard can be applied to packaging in a variety of ways—as set-up boxes, fiber cans, bags, or as wrapping materials.

Fiber cans are of three general types known in the trade as spirally wound, convolutely wound, and lap seam, respectively.

All three types of can bodies are made into completed containers by combining them with tops and bottoms of metal or paperboard. Much variety in design of end closures is possible, and many different styles suitable for specific purposes are manufactured. It has been found possible to produce ends from paperboard which can be applied to a fiber body on slightly modified metal can closing machines.

Without the use of special stocks or auxiliary treatments a fiber can is just a simple paper container with all the inherent weaknesses of paper, such as permeability to water vapor and gases, poor water and oil resistance and easy destructibility. Fortunately there are many ways of correcting these normal characteristics of paper. Fiber containers can now be made which function very successfully as packages for many products which heretofore could be packaged in paper only with difficulty, or which were normally packaged only in metal cans. All three types of cans can also be made waterproof by flushing or spraying them on the inside with paraffin, microcrystalline waxes, or other waterproof materials. Spirally and convolutely wound cans are made moisture-resistant by winding the bodies from moisture-resistant stocks. Lap seam cans can only be made truly moistureproof by spraying or flushing them with moisture-resistant material, or by dipping them in such a material.

At the present time all of these types of fiber cans are finding use both for military purposes and as substitutes for metal containers.

Ion Exchange Resins

Paper presented by Frederick J. Myers, Resinous Products and Chemical Co.

The principle, known as ion-exchange, has long been recognized and has been employed commercially chiefly in water-conditioning processes. But the organic materials hitherto used tended to disintegrate both physically and chemically under alkaline or acid conditions, and their effective range was very limited. The new synthetic resin or plastic exchangers which are known as Amberlites do not disintegrate and can be reclaimed and reused. They have been developed with different properties for varying functions, and several may be required to achieve the particular result desired.

An important application of the new process is in the sugar industry. Crystallization of sucrose from the raw juice has heretofore been an inefficient process. Impurities in the juice retarded crystallization, so that much sugar was left behind in the low-price residual molasses. With ion-exchange methods, these impurities are removed, resulting in increased yield of sugar from a given amount of juice without adding to evaporation or crystallization equipment.

A modification of the process is used for recovering valuable tartrates from wine residues. The reclamation of tartrates from winery wastes has long been practiced, but the process was inefficient and could be used only where the tartrate content was high. Production of tartaric acid on a commercial scale by this resin exchange process is not yet in effect, but its feasibility has been proved experimentally.

Water-conditioning is still a major application of ion-exchange methods. Metals in solution can be removed where they are detrimental to industrial processing and valuable metals can be salvaged from mine and industrial wastes.

Among other uses discussed were the removal of contaminating salts in the manufacture of dyes, drugs, enzymes, gelatin and chemicals and the large-scale production of amino acids.

Laboratory Study of Tri Nitro Toluene Wastes

Paper presented by Stuart Schott, C. O. Ruchhoft and Stephen Megregian, U. S. Public Health Service.

The construction and operation of a number of plants for manufacturing the explosive tri-nitro toluene for carrying on the war has introduced a new industrial waste problem. A recent survey by the Stream Pollution Investigations Station of the U. S. Public Health Service has shown that these wastes are produced in very large quantities in T.N.T. manufacture.

The wastes are usually somewhat acid, have a yellow to dark red color, a characteristic odor and are toxic to fish and other forms of aquatic life. The wastes contain the acid wash water from washing the freshly manufactured T.N.T., the so-called "red waters" which remove the undesirable T.N.T. isomers and innocuous cooling waters. The compounds removed by sulfite treatment give the very high color to the red water and it is the red water which contributes most of the color to the combined waste. Chemically the combined waste is very stable.

Following the testing and failure of self-purification and biological treatment processes, experiments were carried out with methods of chemical treatment of the waste to reduce the color and toxicity before discharge into receiving waters.

None of these proved particularly feasible for various reasons. One method employing an organic solvent was tried which removed about 50 per cent of the color and might possibly be used commercially should further investigation prove satisfactory.

It was also found that the color in the diluted waste could be further reduced by treatment with chlorine or bromine. Although bromine seemed to be more effective in reducing color, economic factors would determine whether chlorine or bromine should be used. The present method of disposal of the waste, where simple dilution is not possible, is evaporation followed by incineration. Considering that commercial by-products are not recovered, it is an expensive process. Further work is necessary to determine whether extraction of the strong waste with an organic solvent followed by chlorination or bromination of the extracted waste would be more effective and economical than evaporation.

Why Glycerin is Scarce

Glycerin, once over-abundant stepchild of the soap industry has become one of the scarcest and most sought-after of war chemicals. Here are some of the reasons why, along with an outline of military, naval and lend-lease uses, civilian requirements, curtailments, and present supply status.

MORE than a year ago the War Production Board completely prohibited the use of glycerin in the manufacture of anti-freeze solutions, and, at the same time, restricted all manufacturers to 70 per cent of their 1940 consumption, unless they were working on medical or military items. This was the first hitch in what was to become a tightening belt of restriction on glycerin and which now has reached the point of almost entirely cutting off supplies of this versatile chemical for civilian use.

Later in 1942 a tightening supply situation required additional cuts in civilian consumption. In November, for example, use of glycerin in tobacco was cut to 48 per cent of 1940 usage, in beverages to 50 per cent, in cosmetics and toilet preparations to 40 per cent.

January, 1943, saw further curtailments. Glycerin was eliminated from candy, beverages and gum. Its use in tobacco was reduced to 35 per cent of 1940 consumption, its use in cosmetics, flavorings and shortening dropped to 25 per cent. In March, 1943, glycerin disappeared entirely as an emulsifying agent in shortenings.

On the first of April, 1943, many more civilian items were added to this list. No more glycerin was allotted to manufacturers of cosmetics, dentifrices, lotions, beverages, flavors, candy and all edible products (with the exception of margarine), chewing gum, shaving cream, tablet and pad adhesives, tobacco, shortening, beverage crown caps, protective coatings for most civilian uses, soaps, hair tonics and shampoos.

Even in those civilian uses of glycerin still allowed, cuts in 1943 quotas amount to millions of pounds. For example the tobacco industry, largest peacetime user, was allowed 1,280,000 pounds during the first three months of 1943, as opposed to a peacetime consumption of more than 22,000,000 pounds during 1940. Cosmetic uses dropped from 4,760,000 pounds in 1940 to 630,000 for one quarter of 1943, and beverages from 3,225,000 to 24,000 pounds.

What are the reasons for this extreme shortage?

Reason 1: Needs of the military and lend-lease have been tremendous.

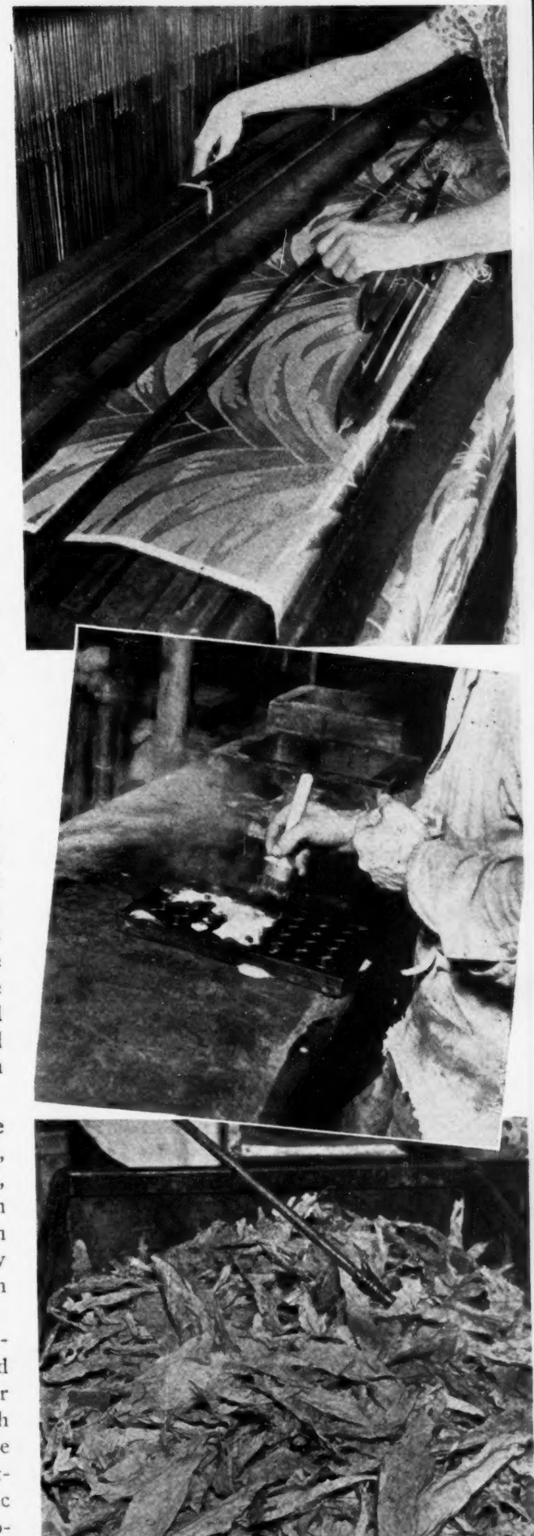
Glycerin was drafted early in this war, not only for the manufacture of nitroglycerin, but for many and varied military uses. Glycerin and glycerin compounds rank second only to alcohol as a solvent in medicinal preparations. In pure form, glycerin is a powerful antiseptic, used in many types of surgical dressings. The highly effective emollient action of the chemical makes it valuable to dentists and physicians in the treatment of teeth and throat disorders, as well as many skin irritations.

Glycerin likewise finds use in a wide variety of indirect military requirements, such as alkyd resin coatings for tanks, ships, planes and other equipment. Even the Army, however, has had less glycerin for protective coatings than it really wanted. Glycerin compounds on wooden ammunition boxes are out.

Cellophane, an item of military necessity, can be made without glycerin, and 55 per cent is. The remaining 45 per cent of military cellophane made with glycerin is restricted to those uses where durability is a main factor, or as a packaging agent for food, where the toxic quality of the glycerin substitutes prohibits their use. The most durable cellophane of all goes into capes for army personnel as a protection against possible mustard gas attack.

Glycerin used in glassine and greaseproof papers is restricted entirely to ordnance and food packaging. In the textile and leather fields, where glycerin is vitally necessary to military dyes, as a leather softener, and as an adhesive in the manufacture of shoes, its use has been curtailed as much as possible.

In the Navy, glycerin is irreplaceable in



Glycerin finds important civilian uses in the textile industry, in plastics molding as a mold lubricant, and in tobacco as a humectant.

gun recoil mechanisms, in hydraulic control mechanisms and other similar equipment, in ship's steering gears and compasses.

Reason 2: Efforts to increase the production of glycerin have met with little or no success, because of raw material shortages.

Glycerin is obtainable by four processes: (1) fat-splitting, a method which produces approximately 10 per cent of our present supplies; (2) fermentation of sugar, used by Germany; (3) synthetically from propylene; and (4) as a by-product in the manufacture of soap, by far the most productive source.

Description of Processes

Fat-splitting is a process whereby basic fats are divided into their component parts, one of which is glycerin. In the past, use of this process has been dependent on the industrial demand for the various other components as well as glycerin. The limited nature of this pre-war demand discouraged development of production facilities in the days when stainless steel and other metals were plentiful. The currently critical nature of these materials needed for synthetic rubber and aviation gasoline plants and many other war uses makes expansion of fat-splitting facilities impossible at the present time.

Fermentation of beet sugar, followed by distillation, produces glycerin, as well as a host of other chemicals. This method is Germany's largest source of glycerin. Alcohol resulting from this fermentation-distillation process goes into Germany's synthetic rubber. Adoption of this method in America, in addition to being economically wasteful, would make impossible demands on our critical metal resources, as well as require huge quantities of sugar, a commodity already rationed because of shipping shortages. Further domestic production of beet sugar would require the use of land now needed for food production.

The synthetic process, which makes glycerin from propylene by going through the steps of allyl chloride and allyl alcohol, was developed only a short time ago and when this country entered the war was still untried on a commercial plant scale.

Unable to increase supplies of glycerin by other means, this country is forced to rely on the normal industrial method which produces glycerin as a step in the manufacture of soap. Fat is saponified with caustic soda or potash. Salt is then added, and the resultant heavy brine, containing glycerin and impurities, sinks to the bottom of the mixture while the pure soap remains on top. The briny residue contains anywhere from 2 per cent to 15 per cent glycerin. After treatment to remove impurities, the residue is evaporated and most of the salt is crystallized, resulting in crude glycerin of 80 per cent concentration.

Distillation of crude glycerin with superheated steam at high temperature and in a high vacuum produces "chemically pure" glycerin—a product containing 95 per cent glycerin and 5 per cent water. Further concentration reduces the residue of water to 1½ per cent or less, furnishing a glycerin suitable for the manufacture of explosive compounds, such as dynamite, double base powder, and other end products of nitroglycerin.

In peacetime, considerable glycerin residue was left in soaps, because there was no incentive for its removal and refining. War demands have forced the abandonment of this practice. Standards issued by the War Production Board last year established 1% glycerin content in soap as the maximum quantity allowable; recent government action has reduced this to 0.8%. Further reduction of this residue is impossible for practical reasons.

Production of glycerin in the soap making process is dependent on the supplies of fats and oils available for this use. During 1941, soap factories in this country used 2,143,000,000 pounds of fat. This figure represents more than double the amount of pre-war imports of fats. In a move to protect the food supply, however, WPB found it necessary to prohibit the use of edible fats and oils in the manufacture of soap and other non-edible products. 1943 production calls for a maximum use of 1,800,000,000 pounds of fats and oils, leaving an annual production capacity of 350,000 pounds unused. Thus, the soap industry is now producing at 80 per cent of capacity.

Fat and oil shortages appeared early in the war. Most of this country's imports came from the Pacific area, and the annual volume of more than a billion pounds dwindled to almost nothing. The rising tempo of war production drew more and more fats and oils into industrial uses, both as raw materials and as lubricants. For example, every ship launched requires an average of 40,000 pounds of animal tallow to grease the ways. Recently, as war fronts multiplied, vast quantities of fats and oils have been shipped to United Nation troops for use as food, military needs, and other supplies.

Fat Collection Will Aid

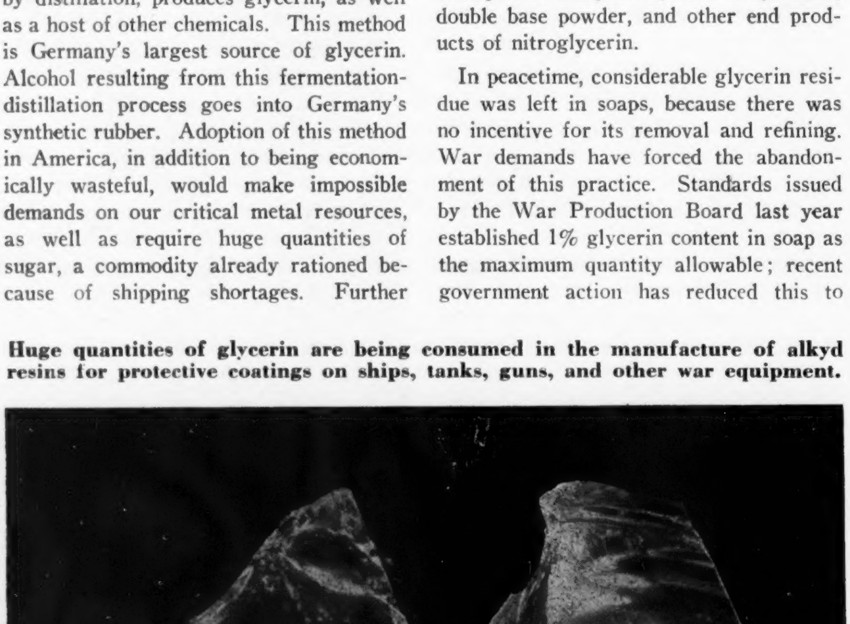
In this country, the squeeze between uncontrolled live stock prices and ceiling regulations governing sales of fresh meat has resulted in packers and butchers leaving more than a normal amount of fat on meat reaching America's tables. This practice cuts sharply into normal fat supplies from packing houses, and has the effect of putting more fat in the kitchens of the country than ever before.

In an effort to recover the fats normally thrown away in the nation's kitchens the government last year began a continuing program to get housewives to return this waste fat to industry through the local meat dealer.

This campaign continues to be an essential long-term salvage effort. Military requirements have increased. Civilian consumption has been cut to bed-rock. Only by continued processing of the waste kitchen fats of the nation can military, lend-lease and essential civilian requirements be met. Other methods of producing glycerin have been explored and found impossible.

Present collections of waste kitchen fats are running at less than 100,000,000 pounds annually. Government efforts are being directed toward boosting this to 200,000,000 pounds, which is the minimum required to maintain essential supplies of military, lend-lease and civilian items containing glycerin.

Huge quantities of glycerin are being consumed in the manufacture of alkyd resins for protective coatings on ships, tanks, guns, and other war equipment.



NEW PRODUCTS AND PROCESSES

By James M. Crowe

Oil-Coal Fuel

Tests to develop a fuel composed of a mixture of oil and coal, have been started by the United States Bureau of Mines and The Atlantic Refining Company in an industrial boiler of the company at its Philadelphia refinery, according to a recent announcement.

If the tests prove successful in developing a colloidal fuel for industrial furnaces, heating plants, and power generators, the amount of oil needed by this type of equipment may be reduced by about one-third.

Past tests to determine the practicability of a coal-oil fuel have proved inconclusive. Moreover, until the war caused the present acute shortage in fuel oil, the abundance and cheapness of this type of fuel left little incentive for experimentation in colloidal fuels.

It was primarily to seek some additional method of conserving fuel oil that the Bureau of Mines initiated the current experiment. Although colloidal fuel probably could not be burned in domestic heating furnaces, its use by heavy industry would undoubtedly result in diverting a large quantity of fuel oil to other industries now seriously affected by the shortage.

It is planned to burn 30,000 gallons of the mixture of heavy fuel oil and powdered bituminous coal in the test boiler while studies are made of methods of storage and of the effects of variations in the mixture and in combustion conditions.

The mixtures used in the experiment contain approximately 60 per cent oil and 40 per cent bituminous coal pulverized into powdered form in grinding machines. The type of coal used is bituminous with a relatively low ash content. The greatest problem is to establish a mixture which will prevent the settling of coal particles and a consequent separation of oil and coal components.

It is pointed out that the mixing could be done in central mixing plants and delivered to consumers just as fuel oil is now delivered. The proximity of bituminous fields to the great industrial centers of the East also would lighten the burden of oil transportation.

Under the agreement by which the tests are being conducted, the government has supplied the necessary powdered coal and oil and the company has contributed the use of its facilities and research department. The data obtained will be assembled by the Bureau of Mines.

The tests now under way at the Point Breeze refinery of the Atlantic Refining Company are designed to determine, among other things, the various types of boilers and furnaces in which the colloidal fuel may be used taking into consideration the combustion space, the size of the passages, the amount of ash in the coal, the fusion temperature of the ash, and the best methods of removing ash from the boilers and furnaces.

New Plastic

A new non-critical phenolic type thermoplastic, chemically perfected from the phlobaphanic structures of the Redwoods, is now available for production of items formerly manufactured from hard rubber and other thermosetting plastic compounds.

Credit for the discovery of this new plastic is shared mutually by The Pacific Lumber Company, San Francisco, The Institute of Paper Chemistry, Appleton, Wisconsin and the Sheller Manufacturing Corporation, Portland, Indiana. These organizations correlated and financed the research necessary before the plastic was finally perfected and ready for commercial use. The new plastic has been called Shellerite.

The story behind Shellerite is as unique and romantic as the history of the redwoods. For years, the mammoth size and great age of these Californian giants have been a challenge to man's scientific mind. Finally it was decided to investigate the chemical structure of the redwoods and learn what effect it had on their resistance to decay and ability to withstand the ravages of time and the elements.

Pioneering investigations were sponsored by The Pacific Lumber Company, who merged their findings and research on this development with the Institute of Paper Chemistry.

Probably the most important discovery thus far, is the one which led to perfection of redwood plastics. It was found that redwood trees produce catechol tannin, a soluble element which in the process of nature is converted into insoluble phlobaphenes. These chemical compounds are said to be the important factors in the lasting durability of redwood and its resistance to decay.

When redwood is reduced to chips and subjected to a short cycle of high pressure steam, the phlobaphenes within the cell structure are reacted. After being defiberized, the resultant fibre or powder produced therefrom becomes the thermoplastic substance. With the recent completion of a large specially designed plastic conversion plant at the mills of The Pacific Lumber Company, located at Scotia, California, in the very heart of the redwoods, this new development has passed from the laboratory test-tube stage into full scale production. Sizable quantities of this redwood resin plastic in its various formulations are now being used.

Molding Process

A new process called Heatronic Molding has been developed by the Bakelite Corporation according to a recent announcement.

In effect, this process utilizes high-frequency heating by generating current in an electrostatic field. A preform or rough shape of the plastic article to be molded is placed between two plates of the heatronic equipment just before it is to be put into the mold. The plates themselves stay cool, but, rough preformed articles become uniformly warm all through as the radio current is generated. Thus, evenly heated throughout its thickness, the plastic preform, transferred to the mold, flows easily into all of the corners and sections to produce a finished plastic part with much less pressure and in much less time.

In addition to the time saved, two other advantages are said to be of importance. First, plastic parts can be molded in thicknesses and sizes hitherto impractical with standard molding methods and conventional equipment. Second, existing molds and molding press equipment may be used to produce plastic parts which, before the introduction of Heatronic Molding, would have required a long wait for the manufacture of high-pressure presses.

Rubber Substitute

A new type chemurgic rubber called Witcogum has been developed from vegetable oils by Wishnick-Tumpeer, Inc., and is being used by rubber-goods manufacturers for a number of applications.

This rubberlike material, which is comparable to rubber in many of its properties, requires neither critical materials nor critical equipment for its manufacture. Standard rubber mills and mixers do its milling and mixing. Calendering, extrusion and vulcanizing are similar to that of crude and reclaimed rubber.

Witcogum, as the new product is called, contains an accelerator of the guanadine type and sufficient sulfur to give a cure in 30 minutes at 40 pounds steam pressure (287 degrees Fahrenheit). All the necessary vulcanizing ingredients are already in Witcogum, though it may be loaded and softened as requirements demand.

Witcogum may be used independently or as an extender blended with natural rubber, reclaim or synthetic rubber.

Proper compounding with such pig-

ments as carbon black or clay or a combination of both will result in higher tensile strength. Tests have proven that tensile as high as 450 pounds per square inch, elongation as high as 150 per cent, shore hardness of 60-65 and tear of 45-50 pounds per inch can be obtained through proper compounding.

Water, alcohol and lubricating oils have no apparent effect on the material, nor do antioxidants upon accelerated aging tests. Generally speaking, its reactions to solvents and chemicals are similar to that of rubber.

New Organic Chemicals

Carbide and Carbon Chemicals Corporation now offers in research quantities for laboratory investigation a new ester, methoxytriglycol acetate or the acetate of methyl ether of triethylene glycol-$CH_3(OCH_2CH_2)_3\ OCOCH_3$. This ester, a colorless liquid, has a boiling point of 244 deg. C. at 760 mm. Because of its structure, methoxytriglycol acetate has excellent solvent powers for cellulose esters and synthetic resins. This property indicates that it probably will be useful in protective coatings and printing inks. Because methoxytriglycol acetate contains no reactive group, it will undoubtedly prove to be useful as an inert reaction medium and because of its low volatility and non-hygroscopicity, it has possibilities as an "anti-dusting" agent for finely powdered materials.

Another new product recently developed by Carbide and Carbon Chemicals Corporation and now available in limited quantities is trimethylcyclohexanol, a cyclic primary alcohol. Trimethylcyclohexanol boils at 198° C. and melts at 35.7° C. Since this is about room temperature the product may be a liquid or solid. It is practically insoluble in water but soluble in most organic solvents, hydrocarbons, and oils. As a mutual solvent and coupling agent for many otherwise immiscible organic chemicals, it makes an excellent replacement for cresylic acid, cyclohexanol and cyclohexanone.

Being a higher alcohol, trimethylcyclohexanol should prove useful as an anti-foaming agent in the manufacture of hydraulic fluids and textile soaps. It may also be used in making plasticizers, xanthates, and wetting agents.

Metal Coatings

Due to the necessary restrictions on the use of tin and zinc, the use of lead alone, and also alloyed with small amounts of tin or zinc or both metals, is being advanced as a replacement coating for hot galvanizing and hot tinning. Alloys of lead and tin have been used as solders and as terne and other dipping coats. Such operations were formerly carried out with alloys containing from 15% tin and up to as much as 63% tin—the eutectic.

Today, the trend is to use alloys containing 90% to 95% lead, with either tin or zinc or both metals making up the balance. Small amounts of antimony, bismuth or silver may be added for different reasons. Some instances are reported, of the use of lead alone successfully, as a substitute for hot galvanizing pole line hardware parts.

The No. 20 Flux and the Fas-Tin Flux are said by the Hanson-Van Winkle-Munning Co., to be suitable for these various kinds of hot coating baths. The operating temperature in each case determines the flux to use. Operations at 800° to 850° F. (the galvanizing range) require No. 20 Flux. Operations in the hot tinning range, (500° to 750° F.) require Fas-Tin Flux. In either case, the procedure in use is the same as in conventional hot galvanizing or hot tinning, but due to the high lead content and certain characteristics of lead itself, several operating details will have to be learned by the workers.

New high lead alloys have been developed, such as "Plate-Loy" to replace the zinc bath in hot galvanizing. No changes in process or materials are required other than the substitution of the new alloy or zinc.

The use of 100% lead to replace hot zinc is somewhat more complicated than the above because there is no alloying or bonding element present.

A series of lead-tin alloys varying from 90% lead and 10% tin to 99% lead and 1% tin is available, which can be applied by regular hot galvanizing or hot tinning practice, but at temperatures between 650° to 750° F. Amaloy is a typical and widely used example. The Fas-Tin Flux has been used with such alloys in the manufacture of finned tubing, air conditioning units and in coating copper wire prior to insulating.

New Tygon Formulations

Fountain syringes, bath mats, ice bags, and other sundries hit by the rubber scarcity, can now be made from new formulations of Tygon flexible plastics according to an announcement from the United States Stoneware Co.

These new Tygon formulations look like rubber, feel like rubber, and while the molding process is somewhat more complex, can be shaped in regular molds.

Serviceable life is said to be longer, due to the basic inertness of Tygon plastics to soap, oils and water. Products may be made in a virtually unlimited color range, transparent as well as opaque.

An apparent obstacle at the present time to a quick solution of the critical shortage of civilian rubber sundries centers around the molds required. It is unlikely that steel will be allocated for new molds for civilian purposes, particularly since ol molds from which rubber sundries wer formerly manufactured are still in exist ence. Ways are being sought to mak available existing molds.

Bell and Baldwin, Inc., a unit of th U. S. Stoneware Company and distribu tors of Tygon products are interested i working out an arrangement with th owners of these molds for their use, eithe on a lease or some other satisfactory basi

New Alkyl Peroxide

A new product described as a formula tion of *t*-butyl hydroperoxide has bee placed on the market and may have ap plications as a catalytic agent in one or two phase polymerizations, as a labora tory oxidation agent, a drying accelerator in paints and varnishes, a bleaching agent for textiles, and a combustion accelerator in heavy fuel oils for Diesel engines.

Laboratory Detergent

A new detergent, Alconol, has just been introduced by Standard Scientific Supply Corporation. The new product is described as a cleanser which relies on physical action for its detergent value by lowering the surface tension of foreign matter adhering to the surface of the utensils to be cleaned.

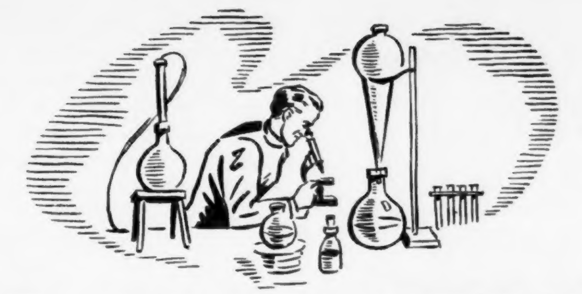
According to the manufacturer, Alconol was put through exhaustive tests by hospital, industrial, commercial and photographic laboratories.

Although it contains no soap, Alconol is said to produce an abundant, efficient lather in water of any degree of hardness without the formation of insoluble calcium soap. It is claimed that Alconol will lather readily in acid solutions. Also, unlike soaps or strong alkalis, the surface tension depressant of Alconol is so great that no film is left on the glass.

Alconol is packaged in dry form. An adequate solution is prepared by adding 1 ounce of Alconol to 1 gallon of warm tap water.

Paper for Protection

A new greaseproof, noncorrosive paper has been announced by Sherman Paper Products to protect metal parts against corrosion. Called V-26, this protective wrapping paper combines two protective laminations in one paper. The inner ply provides a greaseproof barrier for the retention of corrosion-preventives used on metal products, while an outer ply protects the greaseproof membrane against damage in transit. Both inner and outer laminations are noncorrosive, consisting of neutral kraft. The new line is available either with an outer film of wax that provides a self-sealing surface, or uncoated where the self-tack quality is not needed.



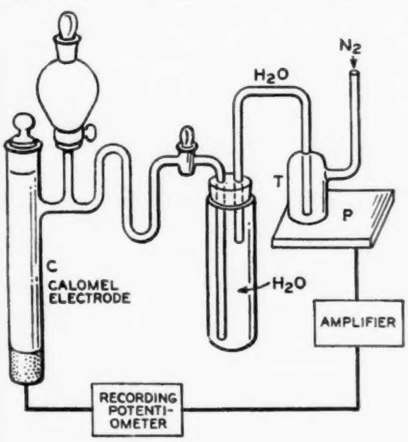
THE LABORATORY NOTEBOOK

Testing Corrosion Electrically

To determine the extent to which various paints inhibit corrosion of metals, a laboratory test has recently been developed by R. B. Gibney of Bell Telephone Labs.

The test involves measurement of the progress of corrosion beneath a paint film by electrical means. The results obtained show how well a given pigment-vehicle combination protects metal against corrosion wholly irrespective of its ability to withstand weathering action. Explaining the theoretical basis for the test, Dr. Gibney states:

"Corrosion of a metal results, in the presence of moisture, from electrochemical action between small adjacent surface areas. Potential differences are set up between these areas, and the potential of the whole surface is the resultant of that



of all the small areas involved. This quantity can be measured readily with reference to a standard electrode. The potentials change as the corrosive action progresses and experiments have shown that the extent of the corrosion can be determined by continuously recording the potential of the metal over a period of hours.

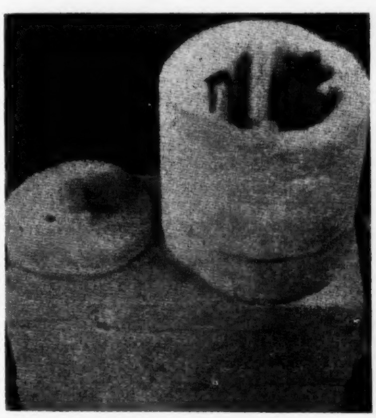
"Surface areas of a corroding metal are of two kinds: anodic or electronegative areas where the metal goes into solution and cathodic or electropositive areas where hydrogen is evolved. If the metal corrodes freely, the cathodic areas tend to become clogged with hydrogen and the resultant potential of the plate will become more electronegative since it is then almost wholly controlled by the anodes. The effect is strongly accentuated and unmistakable when oxygen is excluded. If the metal does not corrode, it is because the anodic areas become insulated with an extremely thin film of corrosion products and the potential of the plate will be nearly that of the cathodic areas which are electropositive. Thus the potential of a corroding metal becomes more electronegative with time while that of a metal which is not corroding becomes or remains electropositive."

As illustrated in the diagram of the apparatus used in the test, glass tubes filled with water connect the paint film, P, to a calomel reference electrode, C. The end of the tube, T, rests on the spot to be measured and is surrounded with an enveloping tube through which nitrogen passes. A recording potentiometer connects the calomel electrode to the back of the painted panel through an amplifier. The latter is required because the high resistance of the paint film permits only very small currents to flow.

Time-potential or corrosion curves indicate the time required for the potential of the underlying metal surface to change from its original, non-corroding electropositive condition to an electronegative or corroding condition.

Electric Furnace

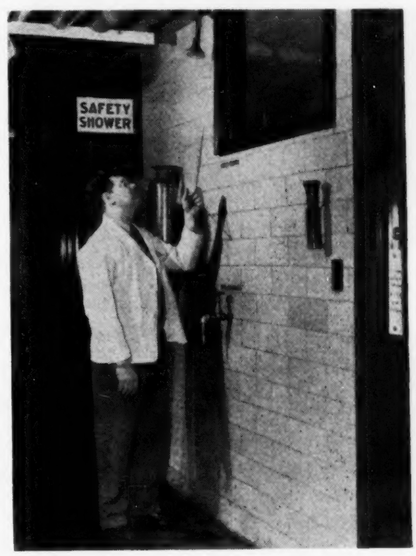
Small electric furnace, made with two insulating firebricks of standard size, 9 x 4½ x 2½", is described by *The Chemist Analyst*. Mr. C. T. Kincaid, Vitrefrax



Corp., suggests cutting both of them to the size 5 x 4½" x 2½". Place the 5 x 4½" faces together and then, using a knife or hacksaw blade, trim off to form a cylinder about 5" long and 4½" in diameter. Hollow out this cylinder, working on one half at a time. The wall thickness of the cylinder should be about ¾". In each half of the furnace leave about three long projections on which to wind the heating element. When completely cut out, the two halves should be fastened together with sodium silicate cement or wire bands.

The amount of heat generated by the furnace will depend on the amount of heating element used; about 28" of No. 20 gauge nichrome coiled element should be sufficient. The element should be put through a small hole in the bottom of the furnace, wound around on the projections and then drawn out of another small hole near the first. Finally, the two ends of the element are wired to a light socket and the furnace is ready to use. A lid for the furnace can be made from one of the extra pieces of firebrick.

Safety for Hercules



Blinded by strong acid or alkali, you may be unable to find the safety shower. Hercules Powder Company solves this safety hazard by attaching shower chain to wall. In an emergency, you head towards the wall, run your hand along it and grab the shower chain. Another safety device used at their Experiment Station is flashlights in wall holders spaced at frequent intervals along corridors and laboratories. These are quickly located during blackouts.

Suggestions Wanted

Have you any convenient, time-saving suggestions for use in the laboratory? Send them to Chemical Industries, *522 Fifth Avenue, New York, N. Y. We will pay $2 for each contribution published.*

PLANT OPERATIONS NOTEBOOK

By W. F. Schaphorst

Relative Humidity

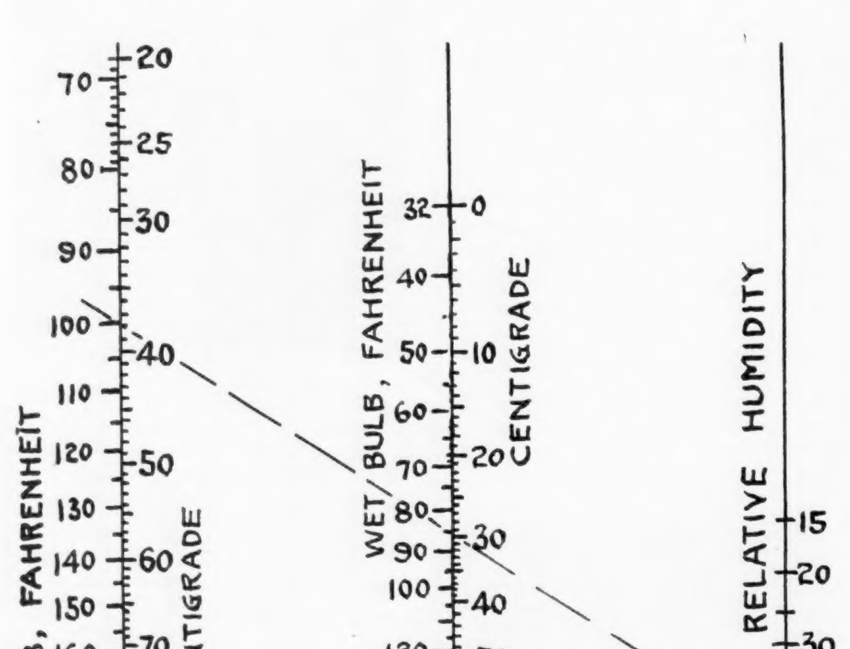
Here is a handy chart for quickly finding relative humidity. Tables and computations are unnecessary. Run a straight line through the dry bulb temperature, Column A, and the wet bulb temperature, Column B, and the relative humidity is instantly given at the intersection with Column C. Thus if the dry bulb temperature is 100 degrees F. and the wet bulb temperature 85 degrees F., the dotted line drawn through these two points and extended to Col. C, shows that the relative humidity is 54 per cent.

The chart is based on a special formula developed by the U. S. Bureau of Standards. The formula has been tested by the Bureau for dry bulb temperatures between 20 and 100 degrees Centigrade. An important advantage of this chart lies in the fact that one is able to read the temperatures in both Fahrenheit and Centigrade.

Friction Coefficients

Chemical plant operators are not always to blame for equipment troubles, as many an operator has often suspected. The designer is to blame. Take for example such a seemingly simple thing as flow of water through a pipe. We all know that when a pipe becomes encrusted with scale, or after its interior is coated with slime, it "resists water flow" more than before. It makes no difference what the pipe is made of—whether cast iron, steel, brass, gold, or even platinum—the effect is the same. It is logical, therefore, that the basis of computation should be on the coating and not on the material of which the pipe is made. The coefficient of friction will be the same in all such pipes after the interior is once coated regardless of the pipe. Before the interior is fully coated it is true that there is a difference, but it is evident that where coating occurs the friction created by the coat must be considered and not the friction on the buried metal. Yet it is not uncommon for designers to use formulas in which the material or metal is specified rather than the coating that is sure to build up.

The same is true of chimneys, ducts, tubing, etc., that become coated during use. Thus after the interior of a chimney is once coated with soot its friction becomes the same as all other chimneys whose interiors are covered with soot. It makes no difference whether the chimney is made of brick, concrete, tile, steel, or anything else. Yet we commonly find formulas that designate different coefficients of friction for the various materials of which chimneys are constructed. Obviously, such practice should be avoided as it is likely to lead to trouble.



Starting New Boiler

Many a new boiler has been ruined when first started because of the protecting grease that was not removed. It is not uncommon for manufacturers to cover the boiler surface with a rust preventive so that it will reach the ultimate user in tip top condition. This protecting film should be carefully removed before using the boiler, and it is easily done by preparing a strong solution of soda ash and boiling it slowly in the boiler. Then drain it all out, and if any trace of oil still remains, flush it out with hot water. Oil in a boiler is bad because it sometimes causes bagging, and bagging leads to failure.

If the setting is also new be sure that it is thoroughly dried out before the boiler is put to work. The best way in which to dry it is to build a slow fire on the grates and keep that fire going until the setting is fully dry—all moisture driven out. Thus if there is oil in the boiler as mentioned above, that process of heating the soda ash solution will at the same time help to dry out the setting, thereby "killing two birds with one stone."

Start a boiler too soon, with the setting still wet, and costly cracks are likely to appear. Cracks in settings are costly because they permit inleakage of air, and inleakage in turn tends to reduce the temperature of the boiler. So, if necessary, keep the slow fire going for a week or more until you are certain that all is well. Then go ahead and "fire up."

Baffle Pointers

An important subject that is not mentioned with sufficient frequency in connection with steam boilers is the baffle wall. To many operators the baffle is just an insignificant part of the boiler and setting and is worthy of but slight consideration.

That, however, is not true. Baffles should be correctly designed, correctly placed in the tube banks, and they should be leakless.

Should the baffles become leaky because of loose or careless construction, the hot gases will "short cut" through the baffles and escape up the chimney without giving up their full quota of heat. The chimney gases will then be too hot. Holes in baffles should be stopped up with a good grade of plastic refractory material. Or, where the baffle is in a tumble-down condition it is better to replace the entire baffle with a new one of plastic composition with corrugated metal or tile separators between the layers. These separators furnish positive expansion joints and at the same time they do not permit leakage of valuable hot gases.

Belt Selection Chart

Here is a chart for modern short center belt drives with the motor mounted on a pivot base as illustrated in the sketch. The chart is based on the fact, discovered by research, that the diameter of the smaller pulley has much to do with the belt width required to transmit a given horse power. Thus in the "old days" we used the rule, "A belt one inch wide will transmit one h.p. for each 800 ft. per min. belt velocity." Such a rule is not applicable to modern short center drives as a study of this chart will indicate.

To use the chart, simply run a straight line through the diameter of the smaller pulley, column A, and the belt speed in ft. per min., column B, and locate the intersection with column C. Then from that point of intersection run a second straight line through the horse power to be transmitted in column D. The intersection with column E then gives the proper belt width to use, whether for normal or heavy duty.

For example, the two dotted lines drawn across this chart shows that where the smaller pulley has a diameter of 10 inches, the belt speed being 1500 ft. per min., and 15 h.p. are to be transmitted, a belt 10 inches wide will be required if the load is normal. Column E also shows that if it is a "heavy duty" load the belt should be a little over 11 inches wide. In other words, column E takes care of both normal loads and heavy duty loads.

On the whole this chart is safe for all practicable short center drives and for all pulley ratios up to 6 to 1; belts being 2-ply and of high quality. For longer center distances the results are even safer. Which means, of course, that this chart may be safely applied to *all* center distances that have the approval of up-to-date practice.

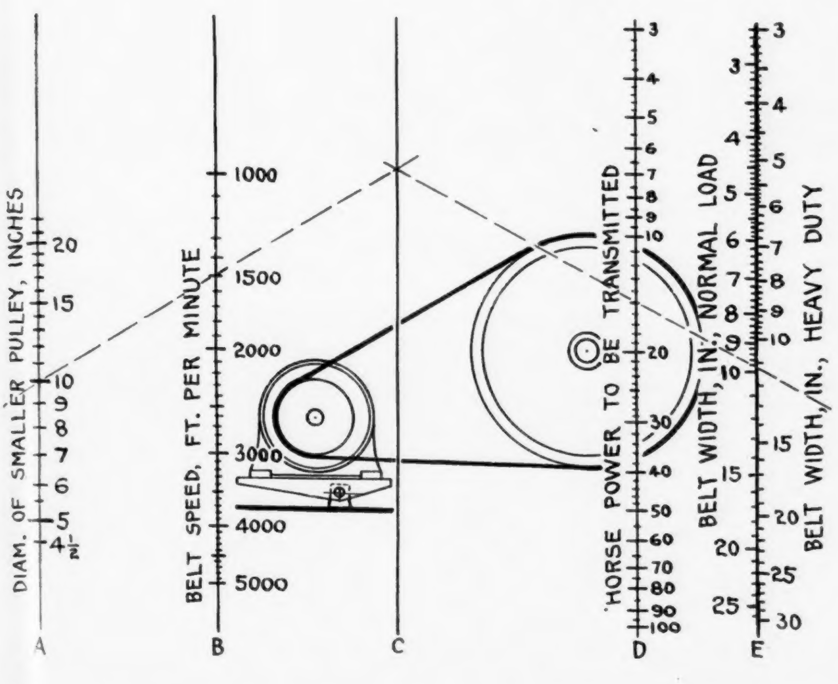
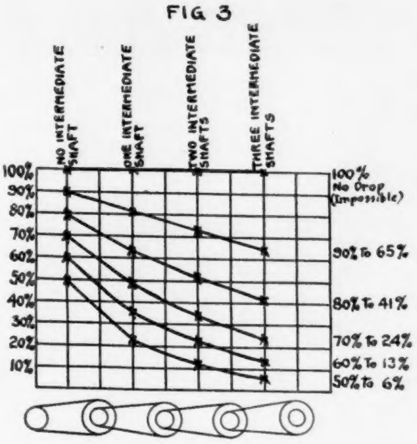


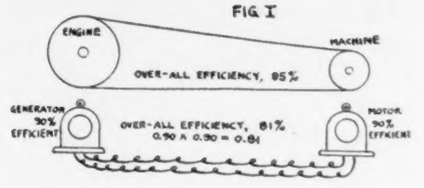
FIG. 3



Power Transmission Efficiency

In an effort to make perfectly clear the efficiency differences that commonly exist between belt and electric power transmission in chemical plants, the sketches herewith have been prepared.

FIG. I



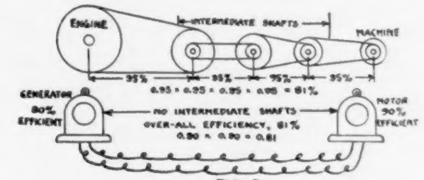


FIG. 2

As shown at the top in Fig. 1, the overall efficiency of a belt drive is commonly 95 per cent. By careful aligning, ball bearings, using high grade belts, etc., efficiencies even higher than 95 per cent are obtained, but 95 per cent is used here because it is no exaggeration.

Below that sketch, Fig. 1, a generator and motor drive combination is shown. If the efficiency of the generator is 90% and that of the motor also 90%, the overall efficiency (0.90 x 0.90) is 81 per cent. If the efficiency of your generator or motor is higher or less than 90%, substitute the efficiency of your own equipment and then compare with the 95% overall efficiency of belt transmission.

Fig. 2 shows that where one has four "re-drives," the efficiency of each being 95%, the overall efficiency (0.95 x 0.95 x 0.95) is 81 per cent. In such a case the efficiency of electric transmission, using 90% for both generator and motor, is just as high as the over-all belt transmission.

In other words, belt re-drives are a "bad thing." Keep the number of intermediate shafts down to the very minimum. "Intermediate shafts" means the number of shafts between the driving machine, whatever it may be, and the driven machine. The reason why re-drives are inefficient is clearly shown in Fig. 3. Thus where the efficiency of the single drive is 90%, and where there are three intermediate shafts, the overall efficiency drops from 90% to 65%, as depicted by the top curve. The other curves show what happens when the unit efficiencies are 80%, 70%, 60% and 50% respectively. Things grow worse and worse. With a unit efficiency of 50% the overall efficiency with three intermediate shafts drops to 6%.

This chart makes it obvious why the efficiency of each unit drive should be kept as high as possible. Thus if 100% were possible, the overall efficiency even with three intermediate shafts would still be 100%. But perfect transmission, of course, is impossible. All we can do is our best.

INDUSTRY'S BOOKSHELF

The Theory of Emulsions and Their Technical Treatment, by William Clayton, Blakiston Co., Philadelphia; 4th edition, with 103 illustrations, pp. vi + 492, $10.00.

DR. CLAYTON, internationally known for his work in this field, has given us a stable, delectable, and nourishing emulsion of the theoretical and technological principles involved in emulsification. Refusing to be limited by the formal definition: "An emulsion is a system containing two liquid phases, one of which is dispersed as globules in the other," he includes the closely allied foams. The chapters are as follows: I. Surface Phenomena; II. Adsorption at Liquid/Liquid Interfaces; III. Dilute Emulsions as Oil Hydrosols; IV. Emulsifying Agents; V. Properties of Emulsions; VI. Theories of Emulsions; VII. Dual Emulsions and the Inversion of Phases; VIII. Emulsions in Biological Investigations; IX. Miscellaneous Emulsions; X. The Preparation of Emulsions—Basic Principles; XI. The Preparation of Emulsions—Technical Operations; XII. De-emulsification; XIII. Physical Measurements in Emulsions. Appendix I deals with the separation of technical emulsions, particularly crude oil-field emulsions, and an additional page gives a list of important patents since 1934.

There are about 2,000 literature references, an excellent coverage; and though the author gives a concise outline of often conflicting views, he does not hesitate to express his own opinions.

This book will be found useful to all interested in physical chemistry, as well as to those in the emulsion field.

Jerome Alexander,
Chemical Consultant.

The Technology of Natural Resins, by Chas. L. Mantell, Chas. W. Kopf, James L. Curtis and Edna M. Rogers, John Wiley & Sons, N. Y.; 471 pp., $7.00.

A PRACTICAL rather than scientific discussion of natural resins (other than rosin and shellac), this book is a valuable addition to any varnish manufacturer's library. The introduction gives a simple, general classification of the resins which is amplified in the chapters on the individual resins so that this formerly rather confusing subject is greatly clarified.

As indicated, the first part of the book deals with the individual resins, their type, sources, general characteristics, and chemical composition. There follow, chapters on physical and chemical properties, solubility, compatibility, thermal processing, chemical modification, and purification. Of these, this reviewer found the chapters on thermal processing and solubility of particular interest and exceedingly thorough. He would, however, take some exception to the discussion of "Reactivity Toward Basic Pigments" in that experience shows a five day test not long enough to determine this point practically and also in the use of the term "*moderately* reactive." This he believes is misleading and should rather be "*dangerously* reactive."

The last half of the book is given over to a very helpful description of the uses of the resins in making oil and spirit varnishes, lacquers, paints and enamels, printing inks, and other practical commercial uses. These chapters are very comprehensive and include detailed formulations. The chapter on oil varnishes might have been more convincing as to the possibilities of natural resins if it were not so obviously aimed at the synthetic resins which emerge from the discussion considerably the worse for wear. In particular, a comparison of the Kauri Reduction values and boiling water tests of 25 gallon varnishes in table LXXV and similar varnishes in table LXXX show some important discrepancies.

Many very valuable tables are included and Dr. Mantell should be congratulated on a valuable and practically helpful, comprehensive treatise on the value of natural resins in the formulation of protective coatings.

Kenneth J. Howe,
Vice President,
The Thibault & Walker Co.

The Amazing Petroleum Industry, by V. A. Kalichevsky, Reinhold Publishing Corp., N. Y.; 234 pp., $2.25.

PETROLEUM is one of the basic commodities of everyday life. From it are obtained high-octane gasoline, lubricating oils, explosives, synthetic rubber, drugs, and many other products from insecticides to asphalt. The college student or engineer who has wanted a brief, non-technical, and interesting resume of what happens in the petroleum industry from the time you strike oil till a Buna S tire rolls off the production line will probably find the answer in this elementary book.

Highlights of the story of a vile-smelling dirty liquid include the location of oil pools, what is petroleum, breaking petroleum emulsions, what makes an engine knock, what are octane numbers, what is cracking, tetraethyl lead as antiknock, the hydrogenation process, aviation gasoline, chemical treatment of petroleum products, chemicals from petroleum, and synthetic rubber. Glossary of terms and list of treatises on petroleum complete the text. It is written in language easily understandable by the layman who is interested in the chemical background of the Jeffers vs. War Department priorities controversy.

Trees & Test Tubes, by Charles Morrow Wilson, Henry Holt and Co., N. Y.; 352 pp., $3.50.

SURVEY of RUBBER HISTORY begins in the Amazon jungles of Brazil, continues with the British and Dutch rubber cartels of the Far East, Charles Goodyear's discovery of vulcanization, synthetic elastomers, and ends with the complete text of the Baruch reports. Mr. Wilson emphasizes the economic, political, and physical conditions which play so important a role in actual rubber production.

The cultivation and harvesting of the Hevea tree, from which over 95% of the world's rubber supply came, is described in careful detail. Potential substitutes for Hevea are guayule, the Mexican bush, and crytostegia, a rubber vine.

"The man with the India-rubber cap, stock, coat, vest, and shoes, with an India-rubber purse, without a cent of money in it" took the tackiness out of rubber and was undoubtedly the greatest of all rubber inventors. The story of Charles Goodyear's tenacious search for the secret of vulcanization, his years in debtors' prisons, his illness and death leaving $200,000 in unpaid debts is contrasted with the developments and financial successes of Hancock and Macintosh.

The description of the little man of the rubber industry, the *seringueiro* or Indian harvester of Hevea, and the system of slavery and usury into which he is forced is a clear reminder of the American sharecropper. The author then discusses the high-finance or power politics of rubber governed by the British-Dutch cartel, who rule well beyond the sight and smell of the Hevea trees and the laborers who tap them.

Chapter on synthetic elastomers attempts to clarify the entanglements of the scientific, political, military, and economic aspects of the rubber shortage. This "No 1 research problem of the war" has many interesting chemical angles that parallel its strategic significance, as for example, the synthetic rubbers of the United States, Netherlands, Japan, England, Germany. Unfortunately these are barely mentioned in passing and could form the basis for another survey.

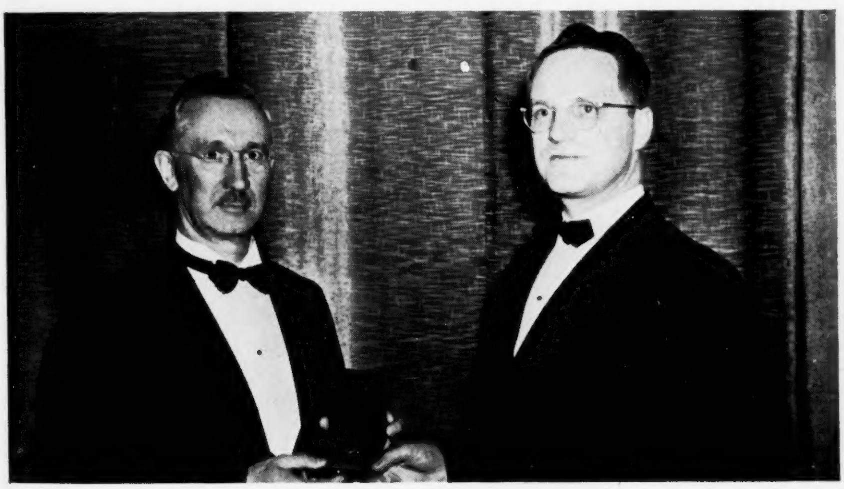
H. Garry,
Editorial Department.

Thirty-Fifth Meeting of A.I.Ch.E.

The American Institute of Chemical Engineers held an informal dinner at the Waldorf-Astoria, New York, May 10, in conjunction with a two-day semi-annual meeting. (See page 630 for full report.) Shown below is the main table occupied by a number of outstanding Institute members and guests.

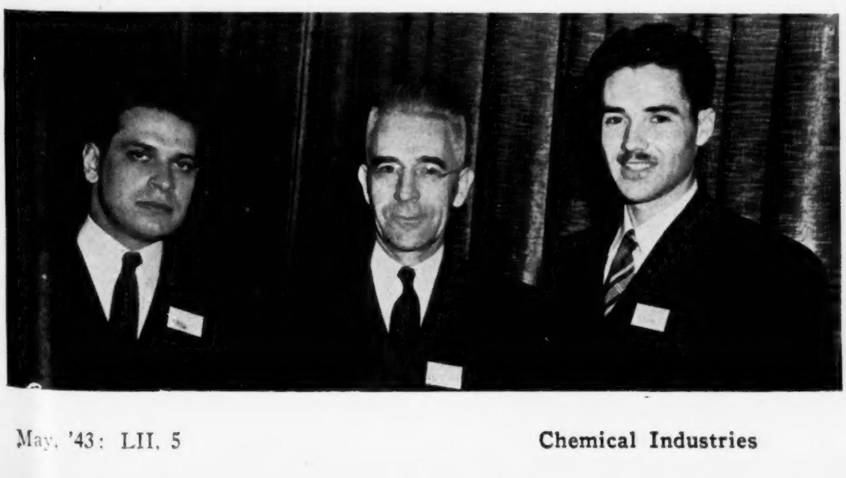
Senator Harley M. Kilgore, left, above, discussed his bill for scientific and technological mobilization and upheld its purpose and proposals. H. C. Parmelee, editor of Engineering and Mining Journal, spoke on same subject from negative viewpoint.

Below. James G. Vail presents the William H. Walker Award for outstanding contributions to chemical engineering literature to Henry F. Johnstone, professor of chemical engineering at the University of Illinois. Professor Johnstone's papers on heat transfer and distillation were cited.



A. E. Marshall, who presented a resolution for establishment of a committee in Washington to advise on draft deferment.

Below, left to right. A. L. Selman of Cooper Union given honorary mention in the A. McLaren White student chemical engineering contest, James L. Bennett, A.I.Ch.E. president and Roger J. Runck, of the University of Colorado, winner of the second prize. For other winners who were not present at the meeting, see page 630.

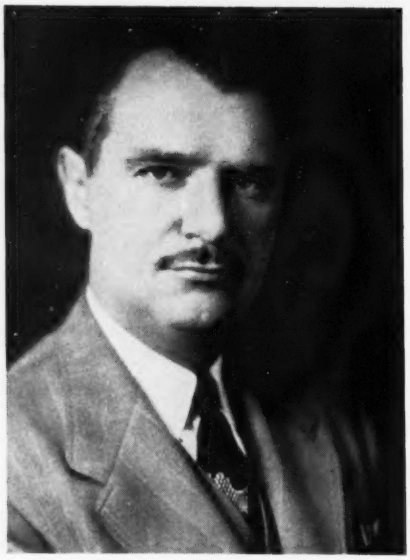


Below. J. H. Rushton, chairman of the Student Chapters Committee, who presented the Student Chemical Engineering Contest awards.

Headliners in the News

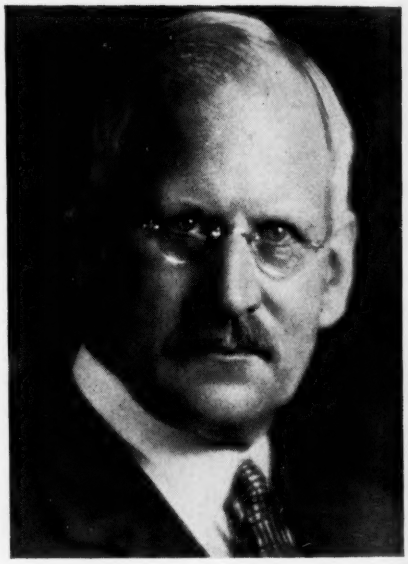
Left. **C. R. De Long,** consulting chemical engineer of New York, was elected president of The Chemists' Club for the year, 1943-1944 at its annual meeting May 5. Mr. De Long succeeds Dr. Walter S. Landis, vice president of American Cyanamid Company, who served as president of the Club for two years.

Right. **Dr. Harold C. Urey,** Professor of Chemistry at Columbia University was awarded one of the two highest medals at the annual medal day ceremonies of Franklin Institute in Philadelphia, April 21. Dr. Urey was cited for his discovery of an isotope of hydrogen of Mass 2.



Left. **Professor Vincent du Vigneaud,** head of the department of chemistry in Cornell University Medical College, has been elected chairman of the New York Section of the American Chemical Society. Professor du Vigneaud is internationally known for his discovery of the chemical structure of biotin, called nature's most powerful vitamin.

Right. **Dr. Samuel C. Prescott,** Emeritus Dean of Science, M. I. T. was awarded the Nicholas Appert Medal by the Chicago Section of the Institute of Food Technologists at its April 20 meeting for his many contributions to food technology.

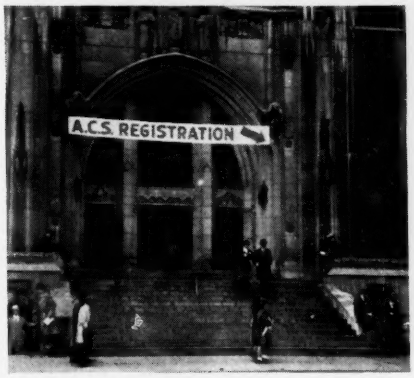


Right. **Thomas H. Chilton,** director of the technical division of the engineering department of E. I. du Pont de Nemours & Company, Wilmington, Del., has been awarded the 1943 Egleston Medal of the Columbia University Engineering Schools Alumni Association for "distinguished engineering achievement."

Mr. Chilton was cited for his outstanding contributions to chemical engineering, science and technology. "He has made outstanding achievements in the discovery and formulation of principles underlying the unit operations of chemical engineering and in the application of these to process development, equipment design and to chemical plant construction and operation."

The Egleston Medal was founded in 1939 on the seventy-fifth anniversary of the School of Mines in memory of Professor Thomas Egleston, pioneer in engineering education and a member of the Columbia faculty from 1863 until his death in 1900. It is awarded annually to an alumnus who distinguishes himself either in the furtherance of his branch of the profession, in the development of processes or techniques, or in the application of engineering principles.

Detroit Plays Host to A.C.S.

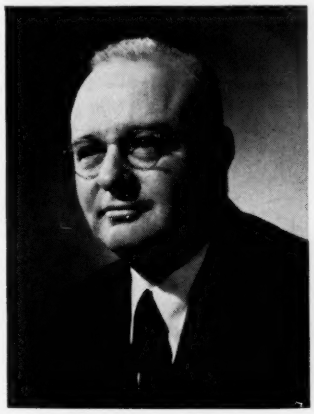


Masonic Temple was used as meeting place and convention headquarters.

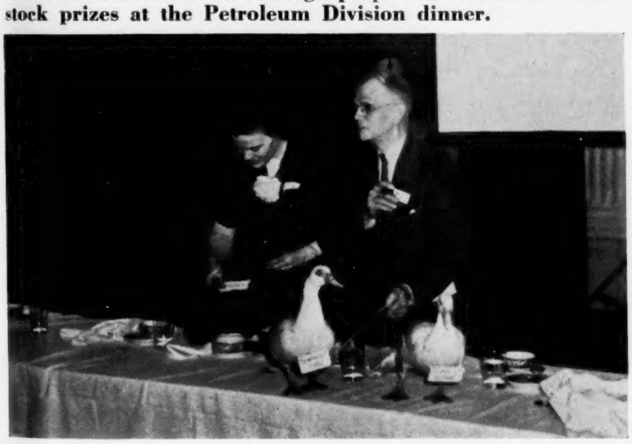
Earl O. Whittier receives the Borden Award from president Per K. Frolich.

Oscar M. Voiles, Voiles Engineering Works; P. E. Loshbough, Michigan Bell Telephone Co.; and L. Scheflan, Pyrene Mfg. Co. spend a few restful minutes in the luxurious lounge of the new home of the Engineering Society of Detroit.

Below, left. Thomas Midgley, Jr., reelected chairman of the Board of Directors. Below, right. Dr. L. B. Sebrell, director of Goodyear Tire & Rubber Company's research department was the Charles Goodyear Memorial Lecturer at the meeting.



Prudence Van Arsdell, Universal Oil Products Co., and Master-of-Ceremonies Delbridge prepare to award the livestock prizes at the Petroleum Division dinner.



Below, left. Walter L. Badger, Dow Chemical Co., and Donald F. Othmer, Polytechnic Institute of Brooklyn, below, right.

Russell B. Akin and E. W. Cronin, E. I. du Pont de Nemours & Co.

Louis C. Fleck, Kimberly Clark Corp., and Charles D. Goodale, Commercial Solvents Corp.

A. H. White Honored on 70th Birthday

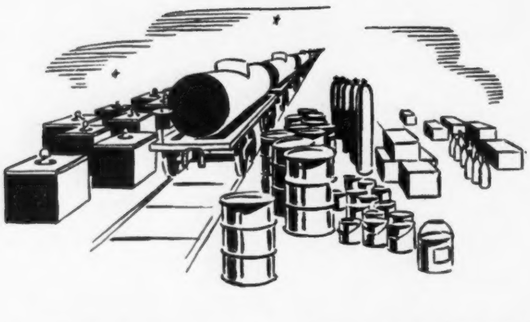
Three hundred and fifty friends and former students of Alfred H. White gathered in the ballroom of the University of Michigan Union at Ann Arbor, April 29, to honor Professor White on his 70th birthday. The celebration was highlighted by words of greeting from associates and representatives of the chemical engineering profession and by presentation to the University of an oil portrait of Professor White by his friends and former students.

Professor White relinquished to Professor G. G. Brown last year the chairmanship of the Department of Chemical and Metallurgical Engineering at Michigan after 29 years in this post and 39 years in the service of the University. He was largely responsible for the establishment at Michigan of the first separate department of chemical engineering in the country. Professor White was a Lieutenant Colonel in the first World War, and is assisting in several phases of government work in connection with the present war. Always active in professional affairs, he served as President of the American Institute of Chemical Engineers in 1929 and 1930, President of the Michigan Gas Association in 1931, and President of the Society for Promotion of Engineering Education in 1941.

Above. ***Head table guests at the party given April 29 in the University of Michigan Ballroom in honor of Professor A. H. White on his 70th birthday include, left to right, Harvey M. Merker of Parke-Davis & Company, who acted as toastmaster, Mrs. Alexander G. Ruthven, wife University of Michigan's President Ruthven, Professor White, Mrs. Shirley W. Smith and Ralph A. Hayward, President of Kalamazoo Vegetable Parchment Company.***

Above. ***Roy A. Plumb, president of Truscon Laboratories, represented the friends and former students of Professor White in presenting an oil portrait of him to the University.***

Left. ***Professor White and his successor as head of the Department of Chemical and Metallurgical Engineering at the University of Michigan, Professor G. G. Brown, greet some of the guests after the celebration.***



PACKAGING & CONTAINER FORUM

Glass Containers Restricted

Temporary restrictions on the amount of empty new glass containers which may be acquired by chemical manufacturers, carbonated beverage bottlers, brewers, distillers, or any other commercial user of glass containers are imposed by Supplementary Order L-103-a, issued April 13 by the War Production Board. The order expires on September 30, 1943. It prohibits acquisitions which will increase inventories to more than a 60-day supply of any particular item.

The purpose of the order is to assure an equitable distribution of glass containers, particularly food containers, during the peak canning season this summer by preventing excessive forward buying of glass jars, bottles, pails, jugs, and tumblers. Glass container demand is exceeding the ability of the glass industry to produce.

Beginning April 18, a commercial user may not accept or have a glass container manufacturer, dealer, or jobber set aside for him any quantity of empty new glass containers which would increase his inventory to more than either two carloads or a 60-day supply of containers of a particular design and finish.

A supplier may not deliver to, or set aside, for a commercial user any quantity of glass containers which he has reason to believe the user is not entitled to accept under the terms of today's order.

In computing his inventory, a user must include his entire stock of all empty new glass containers of the same design and finish and which are on hand in his plant, in transit from his supplier, and set aside for him by his supplier.

The order does not apply to the following:

1. Acceptance of glass containers which were in transit to a user's plant on April 18, 1943.

2. Glass containers for use in packaging fresh fish, fresh shellfish, fresh fruits, fresh vegetables, or products from fresh fruits and vegetables. Fresh products means products which have not been previously preserved or frozen (temporary refrigeration in bulk excluded).

I.C.C. Amendments

The Interstate Commerce Commission, on March 13, issued proposed amendments to the regulations for transportation of explosives and other dangerous articles. The proposed additions or changes of interest to the chemical industry are as follows:

1. *Sec. 4.* The following articles are to be added to the list of dangerous articles. Cyclopentane, methyl cyclopentane, heptane hexane, isobutylene, isooctane, isooctene, isopentane, neohexane, methyl pentane, urea nitrate.

The classification of nitrogen dioxide and nitrogen peroxide (tetroxide) were changed.

Sec. 61, Par. (b) (4). Packing high explosives. Before cartridges or bags of explosives are packed in boxes, lined in accordance with sec. 61 (b) (3), dry fine wood pulp or sawdust at least ¼ inch in depth must be spread over the bottom of boxes to be used for all gelatin and semi-gelatin types of explosives. Dry fine wood pulp or sawdust must also be used in similar manner for packing all non-gelatinous types of explosives containing 30% or more liquid explosive ingredient.

Sec. 61, Par. (f) (1). Packing high explosives with no liquid explosive ingredient nor any chlorate. Ammonium picrate, nitroguanidine, nitrourea, urea nitrate, picric acid, tetryl, trinitroresorcinol, trinitrotoluene, and pentolite, in dry condition, in addition to containers prescribed in sec. 61 (e) (1) to (e) (6), must be shipped in containers complying with certain specifications.

Sec. 110. Par. (a) (8). Packing inflammable liquids. Fiberboard boxes with inside containers which must be: Glass or earthenware, not over 1 quart each; metal cans, not over 1 gallon each. Packages containing glass or earthenware containers must not weigh over 65 pounds gross.

Sec. 110, Par. (b) (6). Packing inflammable liquids. Because of the present emergency and until further order of the Commission, fiberboard boxes, spec. 12B, par. 35, with one inside rectangular metal can, spec. 2F, not to exceed 5 gallons capacity, are authorized. Gross weight of completed package not over 65 pounds.

Sec. 113, Pars. (d) and (e). Packing paint, etc. Paint, enamel, lacquer, stain shellac, varnish, aluminum, bronze, gold, wood filler, liquid, and lacquer base liquid, and thinning, reducing and removing compounds therefore, and driers, liquid, therefore, with flash point above 20° F., may, in addition to containers prescribed in sec. 113 (a), (b) and (c), be shipped in specified containers.

Sec. 163, Par. (c). Packing chlorate of soda, etc. Because of the present emergency and until further order of the Commission, spec. 37F metal drums for chlorate of soda, marked for an authorized gross weight of 160 pounds, may be filled to a gross weight not to exceed 180 pounds.

Sec. 193, Par. (a). Packing picric acid. Picric acid or urea nitrate wet with not less than 10 per cent water must be packed in specified containers.

Sec. 206. Packing sodium, metallic. Metal drums (single-trip) authorized for cylindrical blocks at least 2 inches in diameter and not less than 6 inches in length. Net weight not over 30 pounds.

Sec. 346, Par. (c). Packing methyl bromide. Wooden, wire-bound wooden, or fiberboard boxes, with inside metal cans containing not over 1 pound each; outage required so cans will not become liquid-full at 130° F. Cans must be made with body of at least 95-pound tin plate, with concave ends at least 107-pound tin plate, with all seams soldered or lined to prevent leakage, and with strength to withstand at least 130 pounds interior pressure without leakage.

Sec. 401, Par. (a). Dangerous article—marking. Packages containing inflammable liquids, inflammable solids, oxidizing materials, corrosive liquids, compressed gases, and poisons, as defined herein must be marked, unless exempted, with the proper regulations. For tank cars this marking must appear either on the placards or commodity cards.

Used Drum Prices

Maximum prices for used steel containers apply to sales by emptiers to any purchasers, according to an announcement by the Office of Price Administration issued April 16.

This is made plain in Amendment No. 3 to Revised Price Schedule No. 43, Used Steel Drums, Pails and Containers, effective April 22, 1943. By removing the qualification that the emptied containers are priced as sold to a filler, operation of the schedule is extended to cover purchases by any buyers. Thus, those who buy the containers for reconditioning may obtain them at or below ceiling prices.

After the containers are reconditioned, further sales are subject to control under General Maximum Price Regulation, OPA said, although it is the intention of the price agency to establish dollars-and-cents maximum prices for the reconditioned containers at the earliest opportunity.

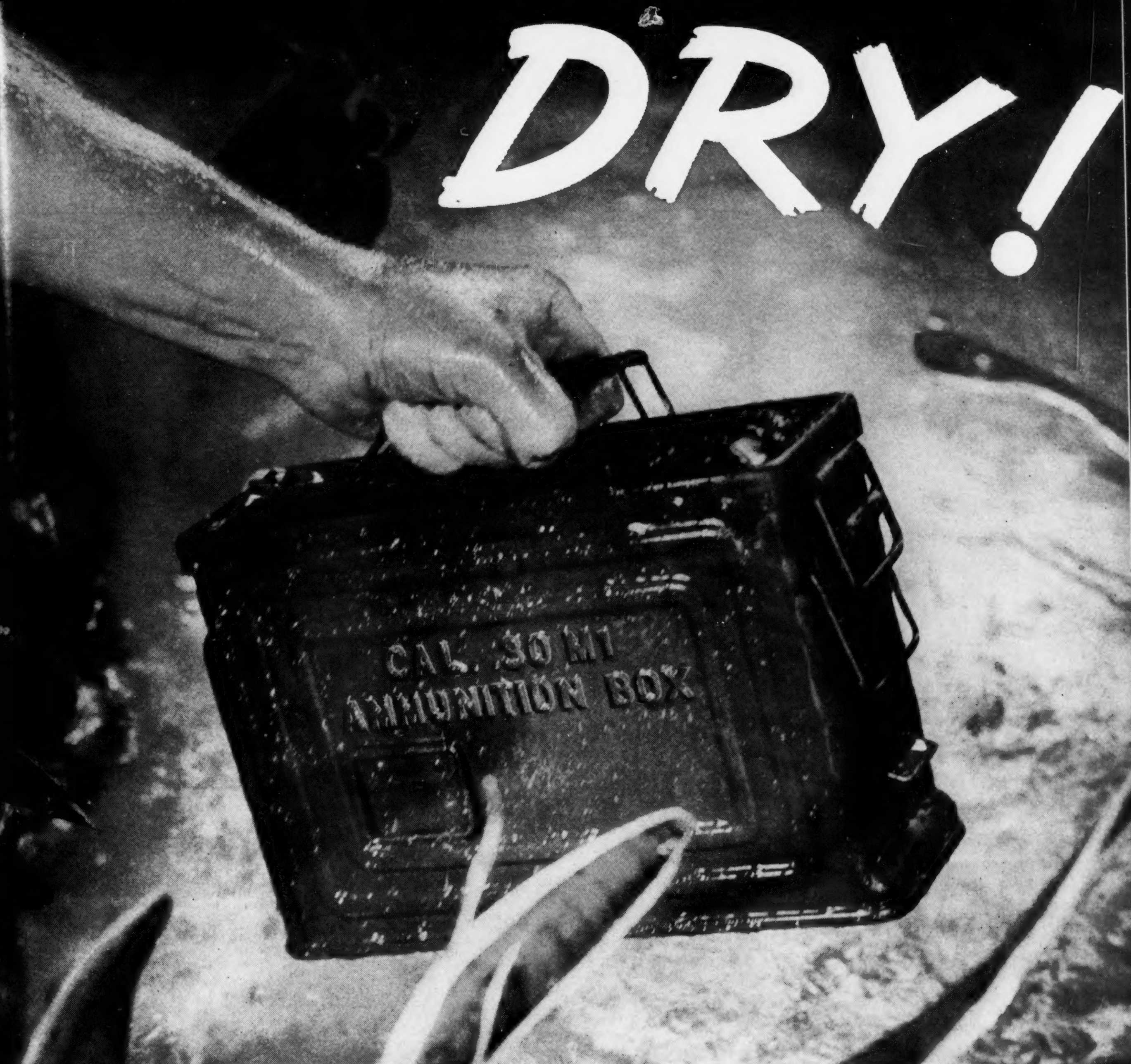
Ceramic Closures

The manufacture of ceramic bottle and jar closures, originally conceived as a conservation measure to effect a saving of critical materials may become a new industry, born of war time emergency. Within a few months after the manufacture of these products was started, the practicability and flexibility of ceramic materials was recognized. Already there are four ceramic closure manufacturers and a diversified market is developing.

Containers for Paint

War Production Board officials have expressed the belief that the paint industry's needs for fiber-side, metal-end containers in quart and gallon sizes will soon be met by the expanded operations of container manufacturers. Expanded facilities for increased production were authorized last February.

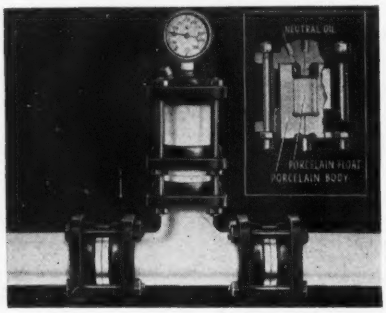
It was also stated, however, that the paint industry could help itself on this situation by concentrating on more essential outside and protective paints and decreasing the production and sale of decorative paints.


DRY!
CAL. .30 M1
AMMUNITION BOX

NEW EQUIPMENT

Porelain Gauge Protector QC244

The Lapp chemical porcelain snubber-type gauge protector is said to make possible the use of standard direct-acting pressure gauges in systems handling corrosive liquids, without danger of damage to the gauge or contamination of product.



In construction, the gauge protector consists of a chamber of chemical porcelain enclosing a porcelain float ground and lapped to a smooth precision fit. The gauge is mounted in the cap in a standard ¼" pipe tap. The cavity between float and gauge is filled with neutral oil. Pressure from the line or vessel below is transmitted through the float to the oil above. Danger of seepage past the float is minimized by the smooth tight fit, and by the fact that pressures are equal above and below the float.

The protector is designed to fit Lapp porcelain pipe of 1" inside diameter.

Thickener Recorder QC245

A new recorder has been developed by the Dorr Company to provide an accurate continuous record of thickener operation. The new recorder, called the Dorr Torq Recorder is designed for use on Dorr "A" Thickeners equipped with a standard overload alarm, it is particularly applicable where appreciable fluctuations in the drive

For a quick, convenient method of requesting additional information on these new equipment items, use the post card on the sheet opposite page 645.

unit load are caused by variations in solids accumulation in the thickener. The recorder can be installed on Type "A" thickeners now in use as well as on new units.

The Torq Recorder consists of two electrically connected control parts—the transmitting unit and the recording unit. The transmitting unit is built into the standard overload alarm on the drive head, while the recording unit can be located at the control station or any convenient point offering easy access to the operator.

As the load develops in the thickener, the impulse is carried directly to the transmitting unit from the overload alarm mechanism. The transmitting unit in turn carries the impulse to the recording unit, where it is transcribed upon a calibrated 24 hour chart, 12 inches in diameter. All variations are continuously recorded in this manner—providing a complete record of Thickener operation for each 24 hour period.

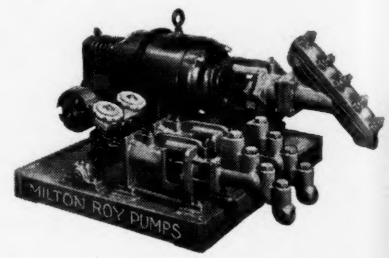
Enclosed Tri-Clad Motors QC246

A new line of totally enclosed motors, the most recent addition to the group of Tri-Clad motors, has been announced by the Motor Division of the General Electric Company. Available in both the polyphase, 60-cycle, induction type and the single-phase, 60-cycle, capacitor type, the new motors are especially designed for use under conditions where abrasives, chemicals, rain, snow, and excessive dirt are encountered.

The poylphase motors are furnished in frame sizes 203 to 225. They include ½, ¾, and 1 h.p. at 900 r.p.m.; ¾, 1, and 1½ h.p. at 1200 r.p.m.; 1, 1½, and 2 h.p. at 1800 r.p.m; and 1½ and 2 h.p. at 3600 r.p.m. The single-phase motors are furnished in frame sizes 203 and 204, and include ¾ h.p. at 1200 r.p.m.; 1 and 1½ h.p. at 1800 r.p.m.; and 1½ and 2 h.p. at 3600 r.p.m. The mounting dimensions of these motors are interchangeable with Tri-Clad open motors of the same rating.

3-Liquid Pump QC247

The special-purpose Milton Roy Step-Valve Pump shown delivers three liquids—one heavy, viscous material and two very light materials, at various required rates of flow to accurately control the volume of each in a compounding operation.

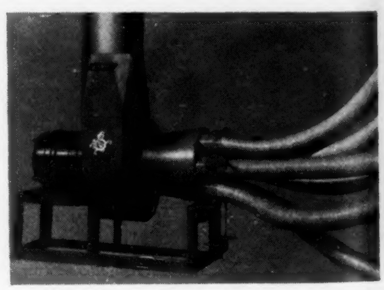


Features of the pump include three Step-Valves, one with a single coverplate. All valves have non-clogging, self-cleaning double ball-checks on both inlet and discharge sides. These are standard type units, with plungers driven by a single motor, variable plunger stroke while operating, all assembled on a special welded steel base.

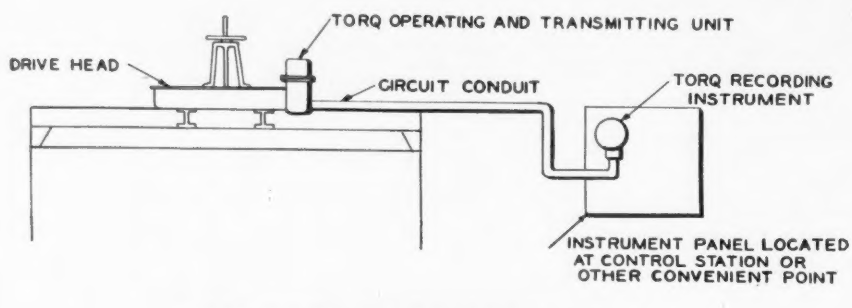
Fume Exhauster QC248

Illustrated in the photograph is the new fume exhauster developed by Chelsea Fan & Blower Co., Inc.

The new features of this unit are that the fumes, gases, dust, filings and grinding compounds do not come in contact with the motor.



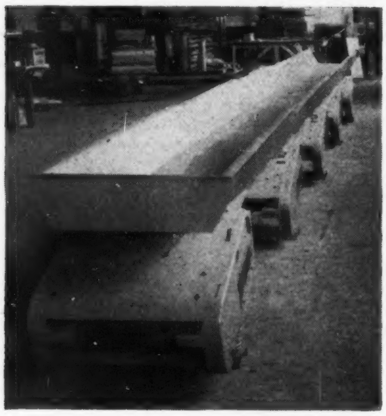
The newly developed centrifugal type blower wheel is made of ⅛" thickness of steel. The 3 h.p. ball bearing motor is tested to an overload capacity so as to meet all the rough usages to which a blower of this type is subjected. The frame work is welded into a heavy unit with handles for carrying. The adapters are interchangeable and can be used for suction or blowing as desired.



THE DORR TORQ RECORDER
FOR TYPE A THICKENER

Vibratory Conveyors QC249

Syntron Company has developed a line of long vibratory conveyor equipment in various styles and capacities.



The illustration above shows a 35 foot section of a 130 foot long flat pan type of conveyor for handling extremely hot materials.

The conveying action is accomplished by high speed vibration set up by multiple, pulsating driving magnets.

There is an entire absence of mechanical moving parts such as motors, gears, bearings, eccentrics, counter-weights, rollers, etc.

Control of the rate of flow of material through the conveyors is by rheostat from either close by or from a remote point. This can also be arranged for automatic control.

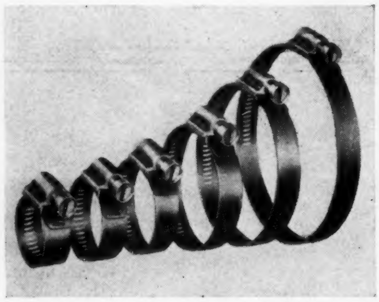
Trough styles can be supplied in either flat pan, as illustrated, or in sealed, tubular sections with or without multiple intake openings or multiple discharge gates at various points.

The major advantages are the entire absence of abrasion, the finger-tip rheostat control of the rate of flow and the ability to handle hot, abrasive materials. When using tubular troughs, poisonous, dusty materials can be conveyed in safety or pure, clean materials conveyed without exposure to dirty atmospheres or foreign materials.

New Hose Clamp QC250

The Aircraft Standard Parts Company has recently introduced a new line of "Aero-Seal" Hose Clamps in fourteen sizes from ¾ inch to 4 inches inside hose diameter. These clamps have been designed with a number of improved and interesting features.

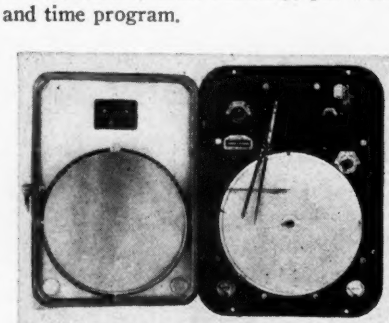
The "Aero- Seal" Hose Clamp consists of a 9/16-inch tempered steel band punched with holes corresponding to the teeth of a worm gear. These holes mesh with a worm in the housing welded to the fixed end of the band. The worm is turned by a screw driver, and the screw head on the worm is fitted with a safety cup which prevents the screw driver from slipping and puncturing the hose or damaging other equipment.



Rapid action is obtained by a ten pitch thread so that full take-up is obtained with only a few turns of the screw driver. The belt-like tightening action is claimed to produce a uniform tangential pull which does not distort the pipe and results in a leakless clamping action. By backing up the screw, the free end of the band comes out of the housing, and the clamp may then be sprung open and slipped over the hose in place on the pipe. Likewise, a clamp may be removed in the same manner.

Air-Operated Controller QC251

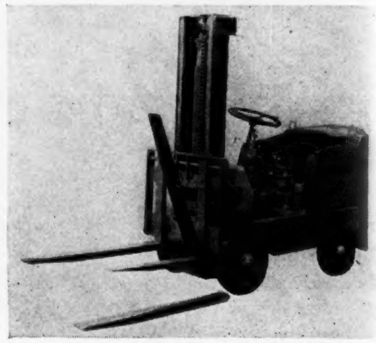
A new air-operated automatic control instrument, known as Convertible Free-Vane Controller, has been developed by The Bristol Company. The new instrument is made for automatically controlling temperature (up to 3600° F.) flow, liquid level, pressure, draft humidity, pH value, and time program.



The Convertible Free-Vane Controller operates on the same basic Free-Vane principle as that used in previous models offered by the company. In the convertible-type controller a number of design refinements have been incorporated, which simplify the instrument and make it more convenient to service. The new instrument is also designed so that the user can convert from one type of control system to another.

Truck Fork Extension QC252

The problem of handling loads of widely varying dimensions on a lift truck with standard length forks is said to have been considerably simplified by new fork extension adaptors developed by Towmotor Corporation. Quickly and easily attached, the adaptors make it possible to extend fork lengths safely as much as 24" in only 15 or 20 seconds. Thus skids or pallets need not conform to a minimum size range to be efficiently accommodated by the same lift trick.



Adaptors are attached as illustrated in the accompanying photograph. When adaptors are held vertically, the eye at the bottom of each is inserted over forks. The adaptor is then slid back to the end of the works, and lowered. It automatically "locks" in position to prevent forward or backward sliding, while side flanges prevent any sideway slipping.

Surface Tester QC253

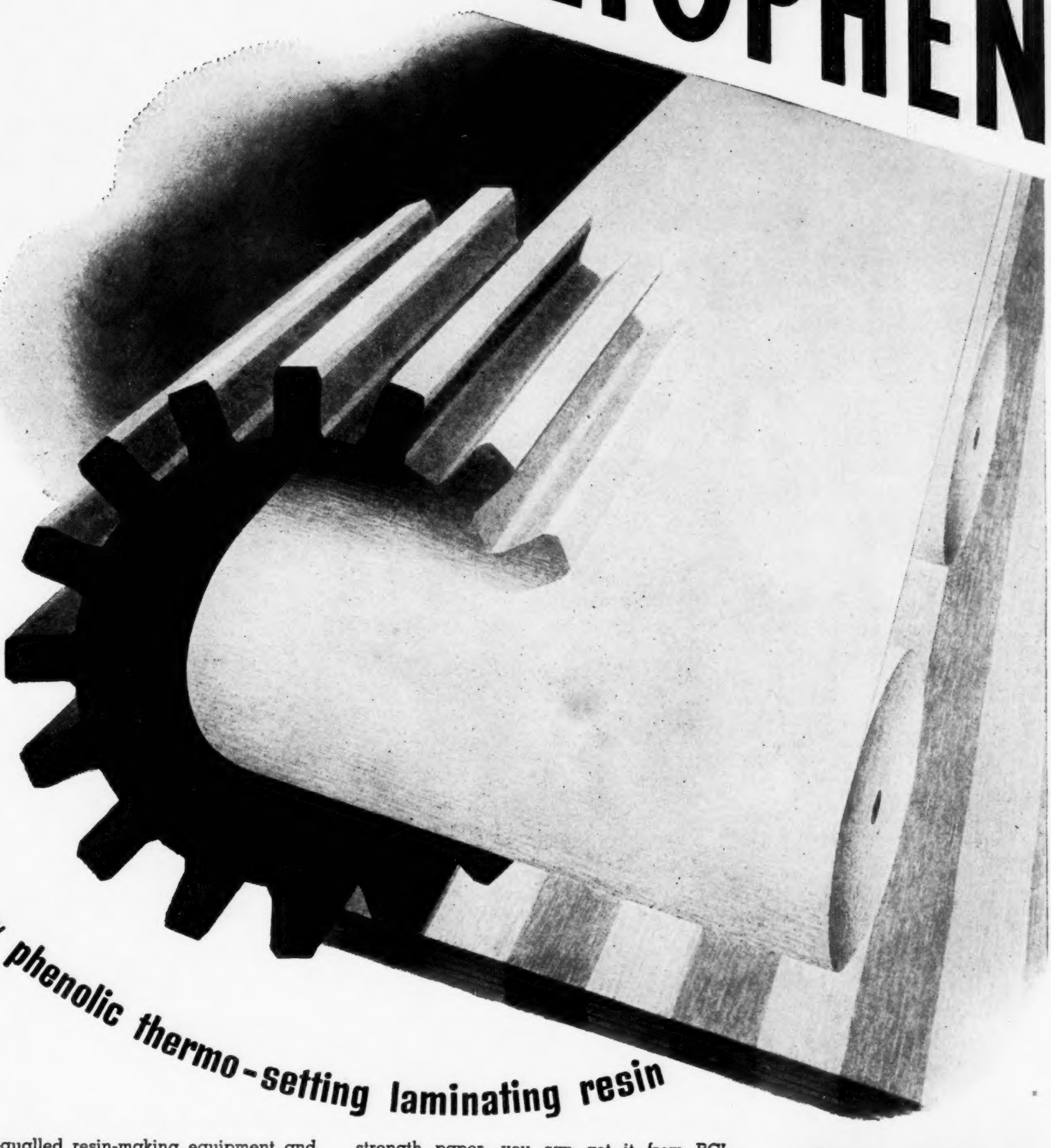
Announcement of a new Shear-Hardness Attachment for Taber Abraser has been recently made by the Taber Instrument Corporation.

This attachment provides a method to measure the toughness quality of surface finishes and their ability to resist digs, scrapes and similar abuse from actual service not considered normal wear.

A weight slides along the calibrated beam until it is finally located in the position where the correct load permits the tool point to cut a groove in the surface finish without digging through to the base plate. Several grooves are made in the surface and the most representative one is selected to measure to the nearest

thousandth of an inch. A special Taber Micrometer is furnished to make the measurement. The shear-hardness of the specimen is calculated by taking the reading from calibrated beam at the forward edge of the adjustable weight which together with the width of groove determines the result by a mathematical formula.

RCI ANNOUNCES PLYOPHEN



a new phenolic thermo-setting laminating resin

The unequalled resin-making equipment and facilities of America's leading manufacturer of synthetic resins are now being applied to the development and production of liquid phenolic laminating resins and varnishes to meet the special needs of this rapidly growing industry.

Thus, whether you require a varnish to meet severe mechanical or electrical tests or a liquid resin for low-pressure molding of high strength paper, you can get it from RCI—together with varnishes and liquid resins for wood bonding, fibre glass insulation or applications requiring extreme water resistance.

Moreover, RCI's new phenol plant will soon be in production to help relieve the phenol shortage and thus alleviate another problem of the plastic industry.

Your inquiries are invited . . . our technical staff is always at your disposal.

RCI

INDUSTRIAL PLASTICS
INDUSTRIAL CHEMICALS
CHEMURGIC RUBBER • SYNTHETIC
RESINS • CHEMICAL COLORS

REICHHOLD CHEMICALS, INCORPORATED • General Offices and Main Plant, Detroit, Mich. Other Plants: Brooklyn, N. Y.; Elizabeth, N. J.; South San Francisco, Calif.; Tuscaloosa, Ala.; Liverpool, England; Sydney, Australia.

FOREIGN LITERATURE DIGEST

By T. E. R. Singer

ZHURNAL PRIKLADNOI KHIMII (JOURNAL OF APPLIED CHEMISTRY, U.S.S.R.), Vol. XV, No. 3 (1942), pp. 173–81.

Thermal Dissolving of Solid Fuels: The behavior of contemporary plant materials and their components which are analogous to carbon forming materials in character (pulp, lignin, cellulose, spores and tars), was studied by dissolving such materials in tetraline. It was found that the solubility of the carbon forming materials was high (85–99%) and was accompanied by rapid decomposition of their organic matter with the formation of gas (4–18.6%), pyrogenetic water (up to 28.7%) and crude benzine (2–24%). 22–92% heavy extract and 1–15.4% insoluble residue were obtained during the dissolving process. The organic matter of the carbon forming materials undergoes intensive reduction during the thermal dissolving process, and this leads to the improvement of the resulting products.

Among the basic components of pulp, cellulose and lignin dissolve in practically the same manner. The lignin, however, gives a greater yield of liquid fuel than cellulose does, since the latter tends to decompose more readily into gaseous products and water. The high yield of light fractions formed in the thermal dissolving of pulp indicates the possibility of utilizing pulp as a raw material for producing motor fuel.

When carbon forming materials which have a high oxygen content are thermally dissolved, the tetraline used as a solvent is dehydrogenated into naphthalene, reducing the organic matter of the fuel. The solvent thus participates in the process both as a physical and a chemical factor.

The thermal dissolving of carbon-forming materials apparently involves the following processes, which take place by the action of high temperature and the solvent: depolymerization, decarboxylization, dehydration, dehydrogenation and the subsequent processes of polymerization, condensation and partial saturation of the double bonds formed. From a technological point of view, the thermal dissolving of carbon-forming materials combines the processes of berginization, extraction and low temperature carbonization. The process of dissolving in tetraline is also further supplemented by the process of partial hydrogenation.

BRITISH PLASTICS—Vol. 14, No. 166, March, 1943.

Synthetic Resin Dispersions and Their Use as Substitutes for Latex, by Chas. M. Jackson, A.T.I.: The outstanding properties of latex latices are their capability of forming excellent adhesion and binding media, and also their film-forming properties in the absence of volatile solvents; such films are pliable, elastic, fast to water and non-tacky, particularly after vulcanization.

In order to prepare latex-like products, it is necessary to convert certain high molecular weight film-forming substances into stable aqueous dispersions. The first to be considered are the monomeric vinyl compounds, derived from ethylene or acetylene. The vinyl compounds are converted into long chain molecular products by splitting up the double bond, followed by polymerization. These vinyl polymers are non-vulcanizable, contrary to latex. On the other hand, they are not vulnerable to the disintegrating action of light, acids or heat, i.e. the polymers and the products prepared from them are, contrary to latex products, very resistant to aging, and in particular are unaffected by ozone.

The viscosity of such synthetic resin dispersions is considerably lower than the viscosity of solutions of products having an equal concentration and molecular size. Whereas with solutions the viscosity is largely dependent on the type of solvent, and rises rapidly with the concentration, this rule does not apply in general to dispersions. Only at concentrations of 50 per cent and over does the viscosity increase by any perceptible degree.

The solid vinyl polymer particles are in a very fine state of division in these resin dispersions. With a moderate particle size of 0.2u the dispersions show no tendency to separate or "cream" and are very stable without any further addition of a protective agent. Bacterial decomposition is, furthermore, out of the question, since these dispersions contain nothing capable of forming a cultivating medium for bacteria.

The dispersions referred to here dry out to practically clear films, even though they contain no solvent, and such films are insoluble in water and cannot be redispersed.

Most synthetic resin dispersions are compatible in all proportions with natural latex, providing it is observed that the latices, which usually show a weak acid reaction, are first made slightly alkaline by the addition of ammonia. In such mixtures the latex portion remains vulcanizable. Mixtures of this type are only justifiable where it is desired either to reduce the disadvantages of latex films—such as the well-known lack of resistance to ageing—or to increase the elasticity of synthetic resin films, where it is found impossible to obtain the necessary degree of elasticity by using the dispersions alone. Unfortunately, it is not possible to cover up the poor resistance to ageing of natural latex completely by preparing such mixtures, since in a purely physical mixture of this type the latex component remains oxidizable.

REVISTA DE AGRICULTURA INDUSTRIA Y COMERCIO DE PUERTO RICO, Vol. 34, No. 2, (1942) pp. 205–7.

Chemistry of Shark Liver Oil: In the last two years shark liver oil has attained a prominent place in the medical field as a source of vitamin A. The sharks most common in the waters around Puerto Rico are the Calcharinus falciformis and the Calcharinus libatus, commonly known as the ground shark. These sharks measure from 5–8 feet in length and yield an average of three gallons of oil each.

There is a great variation in the specific gravity of different samples of shark liver oil, some of them being well above 0.9 and others as low as 0.86. This difference can be traced to the presence of a highly unsaturated hydrocarbon called squalene. This hydrocarbon forms the bulk of the unsaponifiable fraction of the shark oils. Some, of very low specific gravity, contain as much as 50% squalene. Chemically, this hydrocarbon can be considered a polymer of isoprene to which there have been added two atoms of hydrogen. Its specific gravity at 25° C. is 0.8587, which explains why oils rich in this compound are always below 0.9000 in specific gravity.

Experiments at the School of Tropical Medicine with oil from Puerto Rico sharks showed a vitamin A content of 13,000 to 14,000 Sherman units per gram. Average cod liver oil ordinarily runs from 800 to 1000 units. Vitamin D, on the other hand, was low (50 units per gram) as compared to cod liver oil (200 units per gram).

Another Naval Victory!

New Salt Water Soap from Nacconol

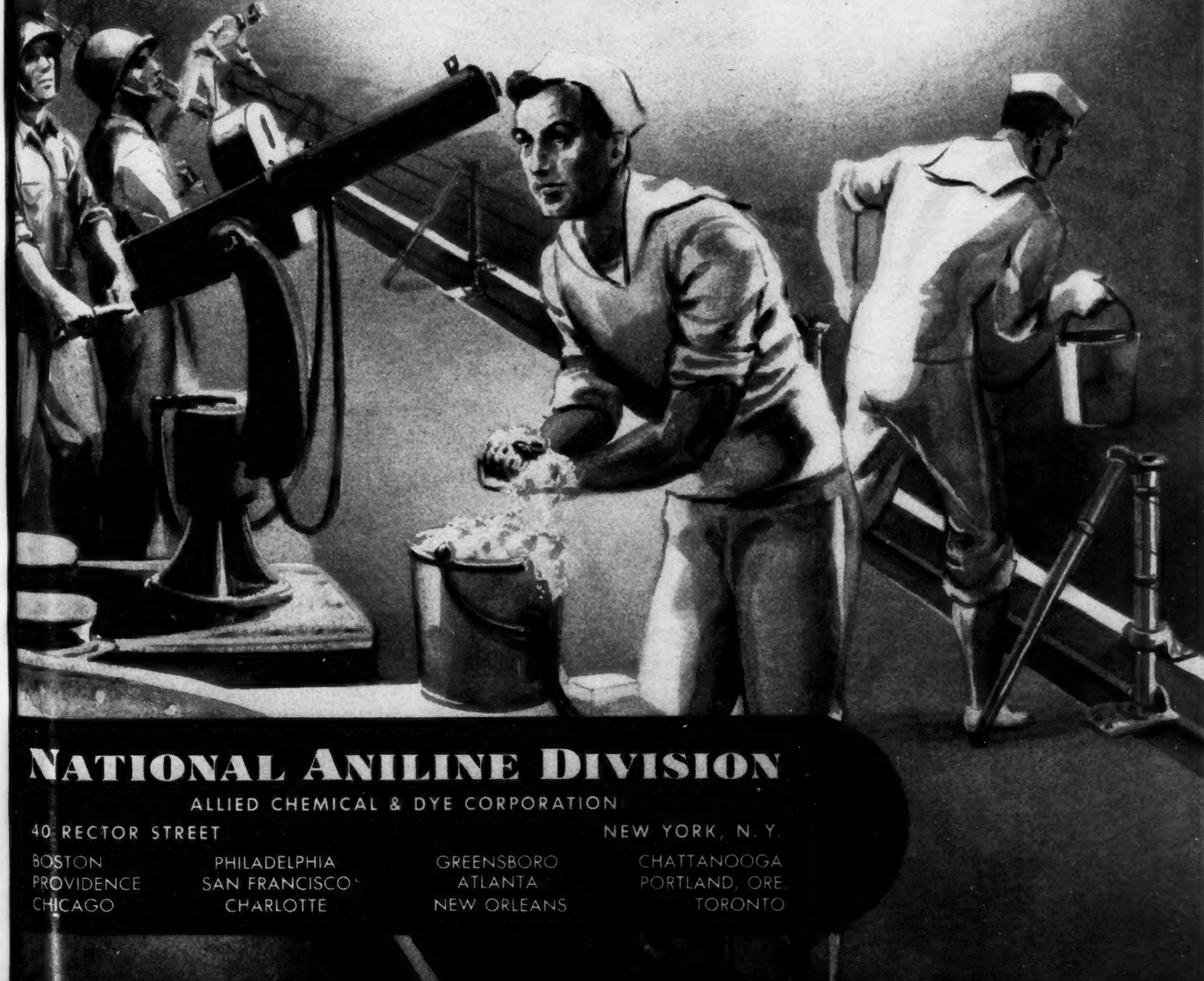
Suds are not guns. They don't shoot. But they can be mighty important as a morale builder.

American sailors are the first to enjoy the luxury of a new kind of salt water suds, and our Navy is the first to have the improved sanitation and cleanliness offered by the new salt water soap produced from Nacconol.

Of late we have been straining our production . . . making all the Nacconol we can, not only for salt water soap, but also for Army mobile laundries, camouflage paints, synthetic rubber, explosives and other war necessities.

That's why, from time to time, we may not always be able to make immediate delivery on Nacconol orders.

To our legion of customers we repeat: "Thanks for accepting the situation so understandingly."



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NEWS OF THE MONTH

A. I. Ch. E. Stresses Need for Continuing Supply of Engineers to Industry

CONCERN over the dwindling flow of chemical engineers from colleges to industry was much in evidence at the record-attended 35th semi-annual meeting of the American Institute of Chemical Engineers held in New York May 10 and 11.

A report on the manpower problem was read at the first session by S. D. Kirkpatrick, chairman of the Institute's Technical Manpower Committee, which outlined the progress that had been made in securing military deferment of engineers and engineering students.

When this committee met in New York in December, a "strongly worded" recommendation was made for the deferment of engineering students needed for war industry and the armed forces. This led to the framing by the War Manpower Commission of a directive deferring all engineering students who would complete their courses by July 1, 1945. However, it did not solve the problem of the tremendous psychological pressure that is placed on such deferred students to get into uniform, with the result that an alarming number are voluntarily attempting to relinquish their deferred status and enlist.

It was this situation that led to comment from the floor that there should be some method of continuing training of engineers specifically for industry. In this regard, A. B. Newman, dean of engineering of the College of the City of New York, stated that there was now on the desk of the War Manpower Commissioner a proposal providing for induction of all engineering students into the Army, some of these to be earmarked for industry and given the full eleven quarters of college training, the others to be given the short course required by the Army. He did not indicate whether or not he thought the proposal would be put into effect.

G. G. Brown, head of the department of chemical and metallurgical engineering at the University of Michigan, stated that in his opinion the universities will end up shortly training only men in uniform. "Naval trainees will be trained on about the same basis as civilian students, and there are some indications that the naval program will soon include some chemical engineering, but this is by no means certain yet." If it does go through it will mean a supply of men with at least limited chemical engineering training for post-war.

The meeting voted unanimously to support a proposal for an advisory committee to work out problems in connection with the deferment of chemists and chemical engineers. The resolution read as follows: "The members of the American Institute of Chemical Engineers express

Prominent in arrangements and program of the Institute's successful streamlined war meeting in New York were H. E. Outcault, meeting chairman; S. D. Kirkpatrick, past-president and honorary chairman; and J. L. Bennett, president.

their belief that many of the existing difficulties incident to the determination of the desirability of deferring chemical engineers and chemists engaged in essential chemical and related industries would be overcome by appointment of an Advisory Committee to the War Manpower Commission which would achieve the objectives of the Advisory Committee on the deferment of physicists set up under WMC Local Board Release 159, and concur in the request recently made by the Board of Directors of the American Chemical Society that a separate Advisory Committee, restricted in its recommendations to chemical engineers and chemists, be appointed."

At the banquet session, Senator H. M. Kilgore defended his bill for scientific and technological mobilization and denied that it was intended to socialize research and industry. "It is an effort," he said, "to see if we can't make the United States the leading scientific nation of the world." Replying to the Senator, H. C. Parmelee, editor of Engineering and Mining Journal, thought that Kilgore had been "ill-advised," and that in formulating his legislation the Senator had had little advice or support from able scientists.

Henry F. Johnstone, professor of chemical engineering at the University of Illinois, was presented with the 1943 William H. Walker Award in recognition of his papers on heat transfer and distillation as outstanding contributions to chemical engineering literature.

The A. McLaren White national student chemical engineering problem award for 1943 was presented to S. Y. Wong, a senior at the University of Texas. Second and third prizes in the problem contest went respectively to Roger J. Runck of the University of Colorado and Herman Taylor, Jr. of the University of Texas. Honorable mentions went to A. L. Selman of Cooper Union, J. Lawry Bennetts of Clarkson College of Technology and Richard A. Oriani of the College of the City of New York.

It was announced that the annual fall meeting of the Institute will be held in Pittsburgh, November 14, 15 and 16.

W.M.C. Job Freezing Order

"Essential activity" is defined in the order as "any activity in the War Man-Power Commission list of essential activities and any activity approved by a regional man-power director as a locally needed activity." The revised list covering 35 essential industries and activities includes the following:

Production of chemicals and allied products and essential derivatives thereof: Glycerin; turpentine rosin and other naval stores; wood tars, oils, acids and alcohols; plasticizers, lubricating oils and grease, animal and vegetable oils, fertilizers, tanning materials, chemical pulp, salt, syn-

thetic rubber, coal-tar products, plastics, compressed and liquefied gases, refined sulfur, acids, caustic and other sodas, alcohols, electro-chemical and electro-metallurgical products such as carbide, sodium and potassium metals and high-percentage ferro-alloys; drugs and medicines, insecticides and related chemical compounds, synthetic textile fibers used in military equipment exclusively, grease and tallow (explosives, flares and other fireworks, generally classified as chemical products, are included with ammunition).

Production of rubber products: All rubber products.

Production of materials for packing and shipping products: Wooden, paperboard, container board, glass, fiber, metal and paper containers and envelopes for shipping and preserving essential products.

Health and welfare services: Medical and dental laboratories.

Salvage Chemicals

Salvage Division, W.P.B., has extended its chemical products reclamation program, designed to make sure that no valuable chemical resources, such as solvents and cleaners, cutting and lubricating oils, paints and chemical by-products, go down the sewer.

In order that they may help plants to improvise equipment for capturing and salvaging chemical products that would otherwise be wasted and lost to further war use, Industrial Salvage Branch, W.P.B., has begun a study designed to locate important chemical reclamation opportunities. One thousand large users of chemical products, including manufacturers of munitions, aircraft, heavy machinery, engines, chemicals and plastics, have been asked to report briefly on their chemical products reclamation practices.

Chem. Professor Retires

Samuel J. Kiehl, professor of chemistry at Columbia, who is retiring after twenty-six years of instruction.

Sterling Products Recalls Castoria Shipments

U. S. Food and Drug Administration in cooperation with the manufacturers of Fletcher's Castoria has been conducting intensive tests of this product in an effort to discover the foreign ingredient contained in those bottles of Castoria shipped since March 1 that causes nausea and vomiting. When the first reports of illness were received, the Centaur Division of the Sterling Drug Co., who make the material immediately notified the Food and Drug Administration of the situation and dispatched 1,700 telegrams to wholesalers in the East, who in turn notified retailers.

In a nation-wide appeal broadcast over all the radio networks and advertised in the country's 1,775 daily newspapers, the Sterling Drug Co. warned druggists, storekeepers, and consumers to return their stocks for refund. Wholesalers and retailers were asked to discontinue all sales of the medicine pending outcome of the tests now being conducted.

General Foods Promotes

Lewis W. Waters

Thomas M. Rector

Formerly vice president in charge of research and development for General Foods, Lewis W. Waters has been appointed to newly created post of vice president in charge of scientific relations. Thomas M. Rector has been named manager of research and development, Waters' former position.

CALENDAR OF EVENTS

AMERICAN ASSOC. OF CEREAL CHEMISTS, 29th Annual Meeting, Hotel Jefferson, St. Louis, Mo. May 17-19.

AMERICAN CHEM. SOC., N. Y. Group, Summer Meeting, Building Trades Club, 2 Park Ave., New York, N. Y. May 22.

AMERICAN CHEM. SOC., N. Y. Section, Annual Outing. June 5.

AMERICAN ELECTROPLATERS' SOC., Annual Convention, Statler Hotel, Buffalo, N. Y. June 7-9.

AMERICAN INSTITUTE OF CONSULTING ENGINEERS, Luncheon & Council Meeting, Engineers Club, New York, N. Y. June 2.

AMERICAN LEATHER CHEMISTS' ASSOC., Annual Meeting, Hotel Statler, Buffalo, N. Y. June 2-3.

AMERICAN MANAGEMENT ASSOC., Annual Meeting, Hotel Pennsylvania, New York, N. Y. June 5.

AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOC., Annual Meeting, The Homestead, Hot Springs, Va. June 14-17.

AMERICAN SOC. OF MECHANICAL ENGINEERS, Semi-Annual Meeting, Hotel Biltmore, Los Angeles, Calif. June 14-16.

AMERICAN SOC. OF REFRIGERATING ENGINEERS, 30th Spring Meeting, Cleveland, O. June 1-3.

CANADIAN CHEMICAL ASSOC., 26th Annual Meeting and Technical Sessions, Montreal, Canada. May 31-June 1.

CHICAGO DRUG & CHEMICAL ASSOC., Annual Spring Meeting, Drake Hotel, Chicago, Ill. May 22.

FLAVORING EXTRACT MANUFACTURERS' ASSOC. of the U. S., Annual Business Meeting, Hotel Pennsylvania, New York, N. Y. May 24-25.

NATIONAL FERTILIZER ASSOC., Annual Convention, Hot Springs, Va. June 21-23.

NATIONAL SANITARY SUPPLY ASSN., Annual Convention, Morrison Hotel, Chicago, Ill. May 17-19.

SOCIETY OF AUTOMOTIVE ENGINEERS, Diesel Engine and Fuels and Lubricants Meeting, Carter Hotel, Cleveland, O. June 2-3.

TANNERS' COUNCIL OF AMERICA, Conference on War Problems, Waldorf-Astoria Hotel, New York, N. Y. May 20-21.

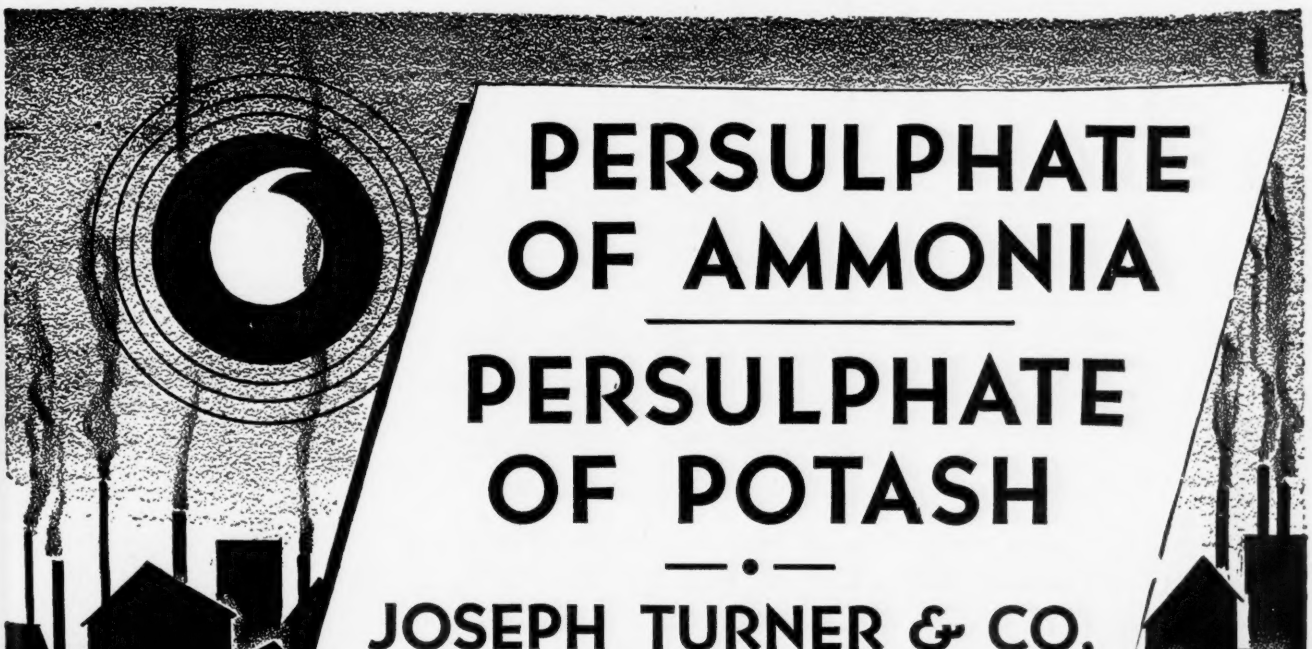
AMERICAN INSTITUTE OF CHEMISTS, Annual Meeting, Edgewater Beach Hotel, Chicago, Ill.. May 15.

INSTITUTE OF FOOD TECHNOLOGISTS, St. Louis, Mo. June 2.

MANUFACTURING CHEMISTS' ASSOC., Waldorf-Astoria Hotel, New York.

NATIONAL ASSN. OF INSECTICIDE & DISINFECTANT MFRS., Hotel Statler, Cleveland, O. June 7-8.

SYNTHETIC ORGANIC CHEMICAL MFRS. ASSN., Seaview C. C., Absecon, N. J. June 4-5.



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Chemicals for Industry

Advisory Committees Formed

Director of Industry Advisory Committees, W.P.B., announces the formation of the following industry advisory committees:

Natural Resins Industry Advisory Committee—Government Presiding Officer, Wells Martin. Committee members are: O. G. Ennes, 533 Canal Street, New York; Geo. Hauxhurst, S. Winterbourne & Co.; W. A. Patterson, G. W. S. Patterson Co.; A. Scharwachter, American Cyanamid & Chemical Corp.; E. H. Winter, H. P. Winter & Co.; A. J. Wittenburg, Stroock & Wittenburg Co.; John Young, Gillespie-Roger Pyatt & Co.

Water Soluble Gums Industry Advisory Committee — Government Presiding Officer: Wells Martin. Committee members are: A. N. Cross, Wm. M. Allison & Co.; G. J. Desmond, Jacques Wolf & Co.; C. J. A. Fitzsimmons, Orbis Products Corp.; A. D. Isbetcherian, 59 Pearl Street, New York; R. Kaiser, T. M. Duche & Sons, Inc.; Morteza Khosrovshahi, 165 Broadway, New York; Ellis Meer, E. Meer & Company, Inc.; Henry E. Price, Colony Import & Export Corp.; Chas. F. Walden, Thurston & Braidich; Roy L. Zeno, S. B. Penick & Co.

Naphthenic Acids and Napthenates Industry Advisory Committee—Government Presiding Officer: T. J. Craig. Committee members are: David E. Day, Richfield Oil Co.; Gerald Fisher, Socony-Vacuum Oil Co.; G. H. Hemmen, Union Oil Co.; J. R. M. Klotz, Stanco Distributors, Inc.; W. B. Lawson, Ferro-Drier & Chemical Co.; W. W. Lawson, Harshaw Chemical Co.; Ralph McGean, McGean Chemical Co.; D. Murray, Cuprinol, Inc.; E. M. Pflueger, Advaice Solvents & Chem. Co.; Leo Roon, Nuodex Products Company, Inc.; J. C. Stirton, Standard Oil Company of Calif.

Furst OPA Consultant

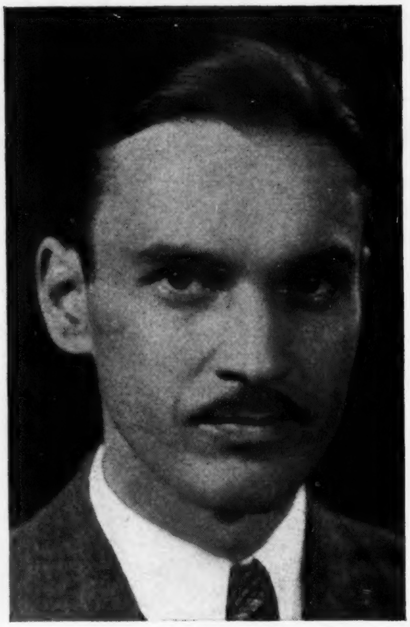
Edward W. Furst, formerly general manager of Grasselli Chemicals Dept. of Du Pont until his retirement a year ago, has been appointed to serve as OPA consultant during the period of formulating the maximum price regulation for sulfuric acid.

Petroleum Specialists Needed

Navy needs men who can qualify as officers in connection with its program for petroleum specialists. Duties: Successful candidates will be commissioned and assigned to duties in connection with petroleum pools already established or about to be established both within and beyond the continental limits of the United States. Such officers will devote their attention to problems related to the inspection of and need for petroleum, as well as those which arise in relation to the operation of refineries. The duties of officers appointed under this program will, in addition, extend to preventive maintenance, the application of petroleum products and the development of new products.

All applications should be made to the Office of Naval Officer Procurement, 33 Pine Street, New York.

Goodrich Advances Two



Dr. Robert V. Yohe

Dr. Frank K. Schoenfeld

Dr. Robert V. Yohe has been appointed plant manager of Louisville, Ky., government synthetic rubber plant built and operated by B. F. Goodrich Co. To Yohe's former post as technical superintendent of chemical division of the company, goes Dr. Frank K. Schoenfeld from the Koroseal labs.

Foreign Periodicals Available

Microfilms, Inc., Ann Arbor, Mich., has issued a list of foreign periodicals available on positive microfilm which they believe they can furnish currently, beginning with Jan. 1942 issue. The list consists almost entirely of German, French, Belgian, and Italian technical and scientific periodicals. The Com. on Microfilming Materials for Research, American Council of Learned Societies, is exercising supervision over the distribution of the films, and passes upon requests for copies as well as the distribution of certain issues containing questionable matter.

A. I. C. Holds Annual Meeting

American Institute of Chemists held its twenty-first annual meeting on May 15 at Chicago, Ill. Speakers included Dr. Bruce K. Brown, Assistant Deputy Petroleum Coordinator, "Petroleum in the War"; Dr. Robert J. Moore, Manager, Development Labs., Bakelite Corp., "Synthetic Resin Plastics"; Dr. H. E. Robinson, Research Labs., Swift & Co., "Meats in the War"; and Dr. David Klein, president, Wilson & Co. Labs., "Vitamins in the War."

At the banquet, the medal of A.I.C. for outstanding service to the science of chemistry was presented to Dr. Walter Savage Landis, vice-president of American Cyanamid Co., in recognition of his work in the field of the nitrogen derivatives. Dr. Gustav Egloff, president of the Institute, presented the medal, after addresses by Dr. Maximilian Toch on "Landis, the Man," and Harry L. Derby, president of American Cyanamid, on the achievements of Dr. Landis.

Chemical Exposition to Be Held in Madison Square Garden

With the Army using the exposition floors of Grand Central Palace as an induction center, it has been announced that the 19th Exposition of Chemical Industries will be held this year December 6–11 in Madison Square Garden, New York City. Exhibit space available will be approximately half that used at the last exposition, but this will all be on one floor. Because of this reduction in space, the committee is requesting voluntary cooperation from exhibitors in limiting individual space requirements to permit accommodation of all who wish to exhibit.

Colorists to Hold Contest

In compliance with the restrictions on travelling imposed by the Office of Defense Transportation, the Council of the American Ass'n. of Textile Chemists and Colorists has again voted to abandon its plans for an annual meeting for this year. Nevertheless, the demand for the continuation of the Intersectional Technical Contest has been so insistent that this event will be held.

Chief Chemist

For many years instructor of chemistry at C.C.N.Y., Dr. Robert Rosenthal has been appointed the chief chemist of Lamon Chemical Corporation.

COMPANIES

Dow Acquires Natural Gas Field

Dow Chemical Co. has added to its properties the entire Evart natural gas field in Osceola County, Mich. The field includes 13 natural gas wells of an average of 1,500 feet and a combined potential production of 30,000,000 feet per day. Dow will extend its present transmission line five miles to transport the gas over a 75-mile route to its plant for fuel and chemical extraction purposes.

International Makes $KClO_3$

Full scale production of potassium chlorate was started late last month in the new $300,000 plant of International Minerals and Chemical Corporation at Columbia Park, Ohio. Completion of this unit marks the first step in a sizable chemical production program planned by International on a 20-acre tract at the Columbia Park location near Cincinnati.

All of the production of the plant is for war uses, according to John H. Merriam, superintendent. Raw materials consist of muriate of potash shipped from International's mines at Carlsbad, New Mexico.

Potassium chlorate used in the United States in the past has been largely imported.

New Chemical Subsidiary

Sergeant Pulp and Chemical Co., Inc., announces the establishment of a manufacturing subsidiary, Sergeant Chemical Co., located at Newark, N. J. According to the parent company, it provides warehousing and manufacturing facilities accessible to trucks and water transportation.

Director, Organic Research

Dr. Maurice L. Moore, formerly employed as research chemist for Sharp & Dohme, has joined the laboratories of Frederick Stearns and Company.

Penetone Corp. Moves

Penetone Corp. has announced the removal of its plant, laboratories, and general offices to a newly acquired building at Tenafly, N. J.

Nitrogen Products Relocates

Offices of Nitrogen Products, Inc. in N. Y. C. have been moved to 630 Fifth Ave., the International Bldg., Radio City.

PERSONNEL

Joins Penn Salt

Dr. S. C. Ogburn, Jr., formerly acting research manager and technical supervisor in charge of new product development, General Chemical Co., has accepted position with Pennsylvania Salt Mfg. Co. as manager, Research and Development Dept.

Commercial Solvents Employs

Recent additions to research staff of Commercial Solvents Corp., Terre Haute, Indiana, include Winifred Mitchell, Earl H. Addison, Oliver E. Hayes, and James R. McClintick. Miss Mitchell, who has specialized in microbiological assays, joins the staff of the company as a bacteriologist. Mr. Addison, is known in the protective coating field as he has been with the Lacquer Division of the Sherwin-Williams Co. for the past ten years. Formerly employed in chemical engineering for the General Chemical Co., Mr. Hayes, will be engaged in similar work for Commercial Solvents. Mr. McClintick was formerly connected with Swift and Co.

Consultants Set Up Separate Offices

After thirty years of association in business, last twenty years of which as firm of Weiss and Downs, Dr. Charles R. Downs and John M. Weiss (shown above Dr. Downs) have set up independent consulting chemical engineering practices.

Tri-Sure News

NUMBER 5 ★ 30 ROCKEFELLER PLAZA, NEW YORK, NEW YORK ★ MAY, 1943

Drums Available

The following is a list of containers available to chemical producers or others without clearance through Steel Drum Allocation Order M-255, and without the necessity of a preference rating. They must, however, be used in conformity with Packing Order L-197. Those interested should contact Charles P. Given, Packaging Unit, Chemicals Division, War Production Board, Washington, D. C., and state in their communication the number of containers they desire to purchase, the products to be packaged, and that the acquisition of the containers would not constitute an unreasonable inventory.

Asheville, N. C.

100, raw, used, 55-gallon, 18 gauge, tight head drums with standard 2 bung closures.

Birmingham, Ala.

81, new, 30-gallon, 24 gauge, 18-in. diameter, corrugated, with 9-in. friction plugs, outside painted black.

Brooklyn, N. Y.

500, new, 41-gallon, 24 gauge, open head, ring seal closure.

650, new, 18-gallon, 26 gauge, removable head.

Approx. 150, new, 10-gallon, 26 gauge, removable heads.

Chicago, Ill.

Approx. 2,500, new, 5-gallon, I.C.C. 37D, lug cover pails.

Approx. 500, new, 52-gallon, 28 gauge, black iron drums, top of drum has 12-in. lid which is held in place by 6 cleats.

1,384, new, 30-gallon, 20 gauge, open head, lined on the inside with a coat of aluminum next to the metal and two coats of baked lacquer over the aluminum.

6,315, new, 16-gallon, 22 gauge, open head, lined on the inside with a coat of aluminum next to the metal and two coats of baked lacquer over the aluminum.

896, new, 10-gallon, 22 gauge, open head, clamp closure, painted on the inside with aluminum paint.

1,221, new, 5-gallon, 26 gauge, open head, lined on the inside with a coat of aluminum next to the metal and two coats of baked lacquer over the aluminum.

7,569, new, 4-gallon, 26 gauge, open head, lined on the inside with a coat of aluminum next to the metal, and two coats of baked lacquer over the aluminum.

394, new, 30-gallon, 19 gauge, 2-in. openings in head and bilge.

187, new, 55-gallon, 18 gauge, 2-in. openings in head and bilge.

Cleveland, Ohio

75, used, 110-gallon, 14 gauge, galvanized, tight head drums.

Detroit, Mich.

128, new, 9-gallon, 24 gauge, lug cover drums, painted red.

85, new, 12-gallon, 22 gauge, lug cover drums with handles, painted red.

Graystone, Ala.

400, new, 24-gallon, 29 gauge, diameter 9-in. (push cover).

Greenville, Miss.

Approx. 300, used, raw, 55-gallon, 18 gauge, full removable head drums with lever lock closure.

Jackson, Miss.

Approx. 200, used, raw, 55-gallon, 18 gauge, full removable head, lever lock closure.

Kingsport, Tenn.

775, new, 40-gallon, 20 gauge, seal-tite closure, open head.

1,022, new, 30-gallon, 20 gauge, seal-tite closure, open head.

107, new, 20-gallon, 20 gauge, seal-tite closure, open head.

350, new, 10-gallon, 22 gauge, seal-tite closure, open head.

143, new, 5-gallon, 26 gauge, seal-tite closure, open head.

Los Angeles, Calif.

Approx. 3,000, used, 24 gauge, standard 400-lb. flake caustic soda drums.

3,000, used, 24 gauge, 200-lb. calcium carbide drums with full removable head.

Marietta, Ohio

375, new, 10-gallon, 20 gauge, full removable head bolted ring seal closure.

450, new, 15-gallon, 20 gauge, full removable head bolted ring seal closure.

350, new, 20-gallon, 20 gauge, full removable head bolted ring seal closure.

350, new, 30-gallon, 20 gauge, full removable head bolted ring seal closure.

850, new, 55-gallon, 20 gauge, full removable head bolted ring seal closure.

Miami, Fla.

5,000, new, 3-gallon, 26 gauge, ears and bails with metal grip handles, 12 lugs, gaskets.

500, new, 6½-gallon, 24 gauge, ears and bails with metal grip handle cover, 16 lugs, gaskets.

500, new, 12-gallon, 22 gauge, drop side handles, 20 lugs, gaskets.

Nichols, Fla.

Approx. 1,000, new, I.C.C. 6A, 30-gallon, 14 gauge, full removable head drums with bolt ring closure, I-Bar rolling hoops.

Oklahoma City, Okla.

Approx. 170, new, 55-gallon, 18 gauge, tight head drums, standard bottoms.

Approx. 140, new, 5-gallon pails with UPressit caps. Gauge reported to be 18.

Salt Lake City, Utah

Approx. 2,000, new, 30-gallon, 20 gauge, full removable head, bolted ring seal closure.

St. Louis, Mo.

Approx. 900, used, 55-gallon, 18 gauge, full removable head, lever lock closure.

St. Paul, Minn.

Approx. 2,500, 10-gallon, 24 gauge, used, with 9-inch lid held in place with 4 cleats.

St. Petersburg, Fla.

443, new, 114-gallon, 16 gauge, black steel, all welded tanks with ¾-in. outlet at the bottom and 3 large outlets in the top; suitable for small storage tanks.

Vernon, Calif.

91, new, 30-gallon, 19 gauge, 2-in. openings in head and bilge.

1,435, new, 5-gallon, 24 gauge, removable head drums.

109, new, 55-gallon, 18 gauge, 2-in. opening in head and bilge.

Waterbury, Conn.

Approx. 2,000, used, 55-gallon, 18 gauge, full removable head drums, some with lever lock closure, and some with bolted ring closure.

Waukesha, Wis.

212, new, 55-gallon, 18 gauge, open head, lever lock closure, body-black, head white.

237, new, 20-gallon, 26 gauge, open head, seal-tite closure; body and bottom red outside, lacquered inside. Seal-tite, painted red.

Wilmington, Del.

Approx. 600, new, I.C.C. 17E, 55-gallon, 18 gauge, full removable head drums, hot dipped tin.

Drum Prices for Empties Apply to All Sales

Maximum prices for used steel containers apply to sales by emptiers to any purchasers, the Office of Price Administration said April 16, in amendment No. 3 to revised price schedule No. 43, effective April 22. By removing the qualification that the emptied containers are priced as sold to a filler, operation of the schedule is extended to cover purchases by any buyers, such as those who buy containers for reconditioning.

After containers are reconditioned, further sales are subject to control under the general maximum price regulation, OPA said; although it is the intention of the price agency to establish dollars-and-cents maximum prices for reconditioned containers at the earliest opportunity.

Courtesy Oil, Paint, and Drug Reporter

Battelle Additions

Harold F. Haase, chemical engineer formerly with A. O. Smith Corp. and American Can Co. has been appointed to the staff of Battelle Memorial Institute, Columbus, Ohio, where he will be engaged in electrochemical research.

Basil H. Minnich, chemical engineer, prior to his assignment to Battelle's division of chemical research was employed by the United States Geological Survey and Standard Oil of Ohio.

Edward A. Beidler, also a chemical engineer, has joined Battelle's division of non-ferrous metallurgy.

Julian W. Nash, chemical engineer, has been appointed to the division of non-ferrous metallurgy. Mr. Nash was formerly associated with Alexite Engineering Co., and prior to that held chemical engineering positions with U. S. Dept. of Agriculture and Du Pont.

Other Personnel

Granville M. Read has been appointed assistant chief engineer of Du Pont succeeding **R. D. Moore,** who has been commissioned a Lieutenant Commander in Naval Reserve and is now stationed at Norfolk, Va.

Robert S. Moore, formerly employed by the oil industry on the west coast, has joined the research staff of Quaker Chemical Products Corp.

Canada's largest chemical enterprise, Canadian Industries, Ltd., announces the appointments of first vice-president, **H. Greville Smith;** vice-president and treasurer, **R. W. Sharwood;** vice-president, **Herbert H. Lank.**

James R. Killian, Jr., has been named executive vice-president of Massachusetts Institute of Technology.

E. George Howe, manager for Molybdenum Products Co., Tacoma, Wash., has established a company office in Reno, Nev.

Henry F. Schippel, of Goodrich Co., has returned to the United States after nearly a year in Africa where he was project engineer in charge of rubber products at two large American repair and maintenance bases. Schippel, has now been assigned to special engineering duties with the company's aeronautical division.

OBITUARIES

P. T. Walden

Dr. Percy Talbot Walden, former dean of freshmen and Professor Emeritus of Chemistry at Yale, who was a member of the faculty for forty-five years, died April 15 at the New Haven Hospital in Connecticut after a brief illness at the age of 73.

Dr. Walden, who retired in 1937, had advised more than 10,000 freshmen during his last thirteen years at the university. He was known as one of the leading teachers of elementary chemistry in the nation and wrote many technical papers.

Ellwood B. Spear

Dr. Ellwood B. Spear, Associate Professor of Chemistry at Massachusetts Institute of Technology from 1910 to 1920, expert on rubber chemistry, developer of "P 33" carbon, and ex-vice-president of Goodyear, died May 1 of a heart attack at his farm in New Hampshire. His age was 68.

Eugene Frost

Eugene Frost, assistant general manager of Atlas Powder Co.'s explosives department and a member of the company's board of directors, died April 20 at his home in Ardmore, Pa. He was 54 years old.

W. N. McIlravy

William N. McIlravy, 73, chairman of board of Barrett Co., Inc., division of Allied Chemical and Dye Corp., died in a hospital in Reno, Nev., April 20.

Adolph E. Valley

Adolph E. Valley, who was Cleveland branch manager of Innis, Speiden & Co., died April 10. His age was 40.

INDUSTRIAL TRENDS

Steel: Production of electric furnace steel in April set a new high record of 382,532 net tons as a result of additional furnaces put into service in the last two months. This compared with a production of 381,219 tons in March and 321,324 in April, 1942, according to the American Iron and Steel Institute. Electric furnace steel is used for aircraft and tank armor and other war materials.

Total steel production last month was 7,374,154 net tons, averaging 99.3 per cent of rated weekly capacity, compared with a high record of 7,670,187 net tons, at 100 per cent of capacity, in March and 7,121,291 net tons, at 97.7 per cent of capacity, in April, 1942.

Production for the current week was scheduled at 99.4 per cent of capacity, indicating an output of 1,721,300 net tons of ingots and steel castings, compared with 98.2 per cent and 1,700,500 tons last week and 98.8 per cent, or 1,710,900 net tons, a month ago. In the same week of last year production was at 99.6 per cent of capacity, equivalent to 1,691,800 tons of steel.

Carloadings: Freight carloadings for the week ending April 30 increased from 780,908 cars to 794,194—topping all figures since the end of last November.

Construction: Construction contracts awarded in the 37 eastern states during the first quarter of this year reached a total of $1,083,876,000, according to F. W. Dodge Corp. While this was a decline of 20% from the high record total of the first quarter of 1942, it was slightly in excess of 1941's first-quarter total.

Non-residential building contracts declined only 7% in dollar volume, as compared with the first three months of 1942. Industrial plant contracts continued in very large volume compared with peace-time records; they amounted to $224,536,000, a decline of only 18% from the first quarter of last year.

Electric Output: Electric power production increased from 3,916,794,000 kilowatt-hours to 3,925,175,000 for the week ending April 30 according to Dun and Bradstreet release.

CHEMICAL SPECIALTY COMPANY NEWS

Glycerine Substitutes

Use of adequate substitutes for the now restricted glycerine in the manufacture of toothpaste was discussed at a meeting of Dentifrice Industry Advisory Com. in Washington. Inability to obtain glycerine has presented a serious problem to the toothpaste industry. The meeting was told that propylene glycol, corn syrup and some supplies of invert sugar might be available as substitutes for glycerine.

Informative Labeling

Attached to the back panel of this container manufactured by Joseph Dixon Crucible Co., is a 13-page booklet entitled,

"New Graphite Know-How Package" which, in text form, explains numerous applications of graphite in addition to giving other directions for using graphite in combination with other ingredients. There is a "tear-out" inquiry page designed to be returned by the user to the manufacturer for further information.

Fluorine Compounds for Insect Control

Bulletin No. 182 of University of Tennessee Agricultural Experiment Station compiles the major results of the experimental work accomplished at the station since 1924 with the various fluorine compounds, with special reference to sodium fluoride, sodium fluosilicate, and cryolite. For particular chemicals it lists their toxicity to insects, insects controlled by them, effect on higher animals, spray residues, and fluorine in foods and beverages, fluorine and sound teeth.

Paint Firms Merge

Edwin W. Tomlinson, president of Tomlinson Paint & Varnish Co. of Chicago, announces a recent merger with the Reliance Varnish Co. of Louisville, Ky. Plant and office personnel of both companies will remain unchanged, Tomlinson continuing as president of Tomlinson Paint & Varnish Co.

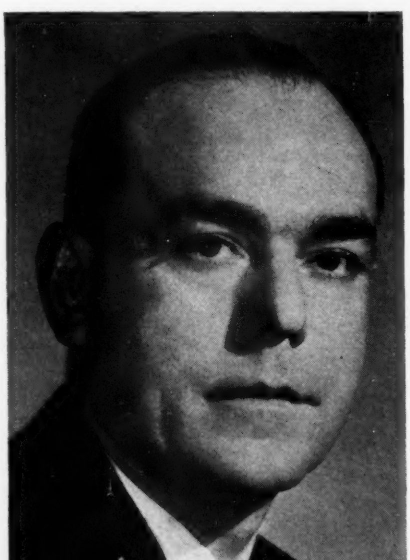
Waxes for Ointment Bases

The function of beeswax in ointment bases, reports the science editor, Journal Amer. Pharm. Assoc., is not only stiffening, but also to increase the water number or water value of the ointment to a considerable extent. Other waxes have been found to have properties similar to beeswax, one of these being ceresin, which is a mixture of hydrocarbons produced by purification of ozokerite. This substance has the ability to stiffen ointment bases and at the same time serves to minimize or eliminate oil leakage, or separation of oils from the ointment when water is incorporated.

Another wax which has been claimed to be as effective as ceresin is a petro-wax, melting at about 160° F. This white micro-crystalline wax is available in quantity and due to its microcrystalline structure might make stable ointments containing as much as 50% water. Petro-waxes are already being used in the preparation of cosmetics, especially cold creams.

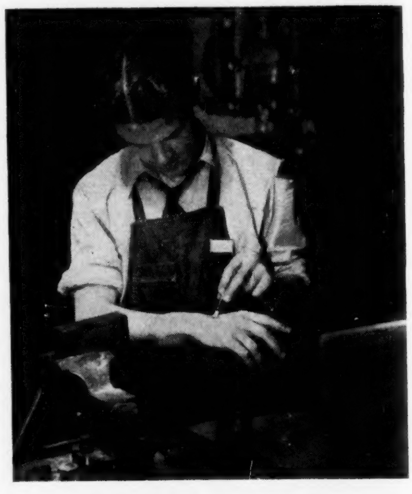
A number of experiments were recently carried out with a view to establishing the efficiency of the petro-wax having a melting point of 160° F. and it was found to form a mixture of suitable consistency and smoothness with the common ointment bases, raising the melting point satisfactorily, stiffening the ointment, and giving it a suitable viscosity.

Strieder Schraffenberger, newly-elected president of the A. S. Boyle Co. and Midway Chemical Co., two subsidiaries of American Home Products Corp.



Wins Packaging Award

Ioply and Mercuroply capsules made by the Johnson & Johnson Co. consist simply of a glass ampoule, containing either iodine or mercurochrome, packed inside



of a short length of a transparent straw. The outer paper cover gives protection to the contents while it is in the serviceman's first aid kit. When it is needed, the package becomes its own applicator. The user merely squeezes the cellulose shell until the glass breaks inside, and the liquid saturates the cotton which seals one end of the straw. It may then be applied to the wound directly, without any danger of spilling, broken glass bottles, applicators or contamination.

Judges of 12th All-America Package Competition recognized this container with a major award.

Powder Guards Troops

Millions of two-ounce cans of body dusting powder for the U. S. Army—already in the packs of North African troops—will protect overseas personnel against typhus-carrying pests.

Though the powder contains some pyrethrum, an increasingly scarce standard ingredient of insecticides, substantial quantities are being saved by use of a developed synthetic. Laboratory tests, according to Grasselli Chemicals Dept. of Du Pont, proved that the replacement compound—called IN-930—increases the efficiency of the pyrethrum in the powder.

Soap Producers Move

National headquarters of the Association of American Soap and Glycerine Producers have been moved to new offices at 295 Madison Avenue, N. Y. C.

Summary of War Regulations

Acrylic Resin Scrap—Restrictions removed on use, processing, acceptance and delivery, except on specific WPB direction. Allocation Order M-260, amended, April 20. Restrictions on acrylic monomer and acrylic resin are not affected.

Adipic Acid—Placed on partial allocation so that persons seeking supply for use other than manufacture of nylon must file application with WPB on Form PD-600. Order M-304, April 2.

Asphalt Products—Methods provided for sellers of special asphalt products to establish their own ceilings. Maximum Price Regulation 323, Amendment 2, April 28.

Chemical Cotton Pulp—Unrestricted aggregate deliveries by producers raised from 1 short ton to 200 short tons in any one month, in lots of not more than 50 short tons per customer per month. Amount which a consumer can accept without restriction also raised from an aggregate of 500 pounds to 50 short tons in a month. Allocation Order M-157, April 20.

Copper—Use prohibited in fans, except as permitted by Order L-176; and in air conditioning and refrigeration equipment, except as permitted by Order L-126 and L-38. Conservation Order M-9-c, amended.

Copper Chemicals—Use in electroplating prohibited in every case where use of copper products or copper base alloy products in plating is prohibited under Conservation Order M-9-c governing copper. Order M-227, April 7.

Copper Sulfate—Eastern producers permitted to make partial adjustment for freight costs in computing ceiling prices for copper sulfate going to West Coast. Maximum Price Regulation 354, Amendment 1.

Ethylene Glycol—Use prohibited in anti-freeze compounds for civilian passenger automobiles, including station wagons and taxis, from April 1, 1943 to March 31, 1944. Limitation Order L-51, amended.

Ferrochromium—Producers instructed to use a specific proportion of low-grade chromium ores to conserve high-grade ores. Direction issued by WPB pursuant to M-18-a, April 22.

Maintenance Supplies—Preference Rating Order P-89 governing maintenance, repair, and operating supplies for producers of chemicals and allied products was amended to conform with present CMP policies and bring producers of these products out from under CMP Regulations 5 and 5a. Under amended order, application for a serial number is to be made by letter to the Chemical Division of WPB instead of on Form PD-315. The letter, however, is to be accompanied by Form PD-762. Under the amendment producers are limited in use of self-assigned ratings to $500 for any single fabricated part as against $250 previously. Minor capital additions not exceeding $500 excluding labor, may be included as maintenance repair and operating supplies.

Nicotinic Acid (Niacin)—Placed under allocation, with unauthorized deliveries permitted up to 5 ounces per month.

Pipe Fittings—Will be administered under L-288 issued April 16 by WPB instead of under Schedule 2 of Order L-42. Provisions of new order are same as old.

Polystyrene—Placed under allocation May 1. Order M-170-a.

Pyrethrum Insecticides—Allocation control of supplies to agriculture delegated by WPB to War Food Administrator. WPB Directive 15, April 26.

Reagent Chemicals—Educational laboratories now permitted to purchase full annual requirements of reagent chemicals in any quarter. Order P-135, amended April 20.

Rotenone—Price ceiling for new rotenone dust base made from ground resin has been established by OPA by valuing the rotenone at $13 per pound and adding delivered cost of the diluent and 3c. per pound for the dust base itself. Maximum Price Regulation 298, Amendment 1, May 3.

Rotenone Insecticides—Package sizes made subject to WPB directive at any time. Exemption made for packages of 1 pound or less in solid form and 1 pint or less in liquid form. Conservation Order M-133, amended.

Shellac—Clarification of definitions and stocks exemption is embodied in an Amendment April 6 to Allocation Order M-106. Amended order defines shellac as including lac processed no further than bleaching with chlorine or cutting with alcohol or other solvents, but not including lac after it has been mixed with a substantial quantity of other materials or incorporated into molding compounds or electrical equipment or parts.

Talc—Amendment to M-239 removes restrictions on delivery and use of steatite talc for other than specified uses, establishes control over production and grading of steatite talc, provides system of inventory control based on maximum consumer stocks, and releases all frozen stocks of steatite talc purchased prior to Oct. 13, 1942.

Tallows and Greases—Dealers authorized to charge a premium for delivery in drums, barrels or tierces, and in carload and less than carload lots. Revised Price Schedule 53, Amendment 29, April 6.

Tallows and Greases—Only persons with a priority order or rating from the Food Distribution Administration may pay a premium for tallows and greases in drums, barrels or tierces. Revised Price Schedule 53, Amendment 30, April 19.

Tar Acids—Imported finished tar acids, including ortho-cresols and meta-cresols, brought under specific ceilings in regulation controlling imported cresylic acid ceilings. Total resellers mark-up on cresylic acid is limited by OPA to not more than 5c. a gallon over importer's ceiling price. Procedure for price control of imported ADF cresylic acid established in the event a government agency, such as Defense Supplies Corporation, becomes sole importer. Maximum Price Regulation 192, amended April 28.

Thiamine Hydrochloride (Vitamin B_1)—Placed under allocation, with unauthorized deliveries permitted up to 25 grams per month.

Vinyl Polymers—Delivery of 50 pounds or less permitted per customer per calendar month. Delivery or use of vinyl polymers for experimental purposes and delivery of vinyl polymer scrap to producer or scrap dealer are exempted from WPB authorization acceptance. Vinyl polymers redefined to exclude acrylic resins as defined in Order M-260. Allocation Order M-10, amended April 21.

MARKETS IN REVIEW

PRESSURE on chemicals and other industries to bring production up closer to war objectives increased during April. The Federal Reserve Board's chemical production index had touched the new high point of 209 during the first quarter, a rise of 9 points since the close of 1942, as war expenditures attained an annual rate in excess of 84 billion dollars.

As no important new chemical plant expansion or construction is scheduled over the remainder of 1943, it is evident that the industry is expected to provide any further chemical increases out of (1) existing production facilities, and (2) through constant and progressive curtailment of civilian goods outputs.

We have it on the word of the Office of Civilian Supply, War Production Board, that consumer goods and services purchased in 1943 will be about 15 per cent below 1942, and that during the second half of the year the drop may be as much as 20 per cent.

The textile industry, normally one of our largest chemical consumers, illustrates at this time the far-reaching effects of a major shift from a civilian to a total war economy. It takes annually many thousands of tons of caustic soda, chlorine, ammonia, acetic acid and anhydride, carbon bisulfide, dyestuffs. Silk and nylon were early civilian casualties, and now rayon and acetate are going to war in a big way. The rayon yarn situation has tightened considerably and recent new Army demands for 150-denier may make that construction non-existent as far as non-military consumers are concerned. Fine-denier viscose is being absorbed for military uses in increasing amounts.

Acetate yarn also appears slated for further disappearance from the civilian goods field. New Army cloths have been developed which will take a considerable percentage of future production. Acetate only recently, for the first time, found a large market in women's hosiery, in addition to the longer established outlets in dress goods, underwear, suit and coat linings. Acetate production amounted to 169,000,000 pounds in 1942; viscose to about 300,000,000 pounds.

Labor, transportation and the nitrogen supply situation made it difficult this spring to supply the mixed fertilizer needed for food crops, cotton, tobacco and oilseeds, although the first heavy spring requirements of farmers have been distributed without serious shortages under the regulatory order, Food Production Order No. 5, administered by the Department of Agriculture. The year's fertilizer consumption, the National Fertilizer Association estimates, will be nearly 10,000,000 tons. It was less than 5,000,000 tons a decade ago.

Under the regulations the government expects to save some 35,000 to 40,000 tons of nitrogen through tonnage restrictions and grade substitution, but the gain is more than offset by the loss of organic nitrogen, such as meals and animal wastes, to the feedstuffs manufacturers. Nitrogen is called the key to the fertilizer situation, and steps may have to be taken to provide more inorganic chemical nitrogen, either Chilean natural or the domestic synthetic. Nitrogen used as fertilizer last year totaled 415,000 tons (in terms of N) largest for any year excepting 1941. Potash production was just doubled at 540,000 tons (K_2O) for fertilizer use, and imports supplied only about 1,000 tons. From phosphate reserves sufficient to last 3,000 years the American industry also furnished 5,972,000 tons of superphosphate (basis 18% P_2O_5) an all-time record.

The temporary settlement of the wage dispute between the coal miners and the government staved off what could have been a very serious situation for chemical manufacture. From the 183,400,000 gallons of coal tar produced here last year, the industry provided many vital explosives, dyes, solvents, synthetic resins, and pharmaceuticals essential to the war and civilian use. The Government is withholding data on benzol, toluol, phenol, naphthalene and xylol outputs as vital war information, and while the great bulk of toluol production for TNT may be accounted for by petroleum processes, the amount obtained from coke plants is still important. A reduction of any size in byproduct ammonium sulfate and ammonia liquor would further unbalance the nitrogen supply for agriculture. Stocks of coke-oven and coal-tar chemicals were down sharply in March from the previous month as far as the reportable items, ammonium sulfate, ammonia liquor and creosote oil were concerned.

Coal and lime are two of our most basic raw materials for chemical manufacture. In the white heat of the electric furnace they are made into calcium carbide and acetylene; fused with nitrogen they become cyanamide, a basic chemical from which cyanides, urea and many essential products are derived.

Production appears to be catching up with some urgent needs in the hard-pressed drug and pharmaceutical lines. The WPB said at the start of May that these consumers need expect no further curtailment in ethyl alcohol, also that isopropyl is available in more liberal quantity for rubbing compounds. The sulfa drugs are now in good supply, including sulfadiazine which was in limited supply at the close of last year. Both military and civilian users have benefitted as the result of expansion planned early in 1942. Production of the synthetic antimalarial compound atabrine has been increased through coordinated British and American efforts, and the product here will be made available under the labels of six manufacturers.

Heavy demands for Lend-Lease and for domestic food manufacturers evidently have run ahead of increased vitamin production. Vitamin C (ascorbic acid) went under allocations last December, and B-2 (riboflavin) was subjected to similar regulations in April. During the first week of May, vitamin B-1, nicotinic acid (niacin) and the latter's amide were placed under allocations. Shortly before the latter action, WPB officials explained that B-1 (thiamin hydrochloride) had been in liberal supply but that the food program was taking very large quantities. The riboflavin and niacin orders were issued as a measure against "maldistribution." With regard to glycerine, the long-term outlook remains black, and the government has informed the drug manufacturers that they will have to get along on 60 per cent base period consumption.

Dwindling supplies of fats and oils, which in normal times run into billions of pounds, create difficulties for others in addition to the producer of soap and glycerine. The paint, varnish and lacquer industry has been watching its supplies of drying oils disappear steadily under curtailed imports and regulations; now faces a further drastic cut in linseed oil for civilian paints. An industry advisory committee was informed that this step will be necessary in order to balance future supplies of oil against the demand. At the same time, optimistic forecasts of tung oil production for 1943 have been scaled down sharply. The Commerce Department now does not look for a yield of tung oil greater than 6,500,000 pounds, instead of the 10,000,000 pounds anticipated earlier. Sudden, intense cold in the tung belt last February damaged the trees. Dehydrated castor and other synthetic drying oils probably will not be available outside of military uses to fill the gap.

Heavy Chemicals: Considerable quantities of alkalies, ammonia, phosporous compounds, chlorine, insecticide bases

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U.S.I. CHEMICAL NEWS

May ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1943

Revised Data on Solox Properties Issued by U.S.I.

New Folder Lists Applications Of General-Purpose Solvent

Revised information on the specifications for Solox, the popular general-purpose solvent, has been prepared by U.S.I.

The authorized composition of Solox now calls for the addition of the following to every 100 gallons of S.D. Alcohol No. 1:

Denaturing Grade Methanol	2.0 gals.
Ethyl Acetate	1.0 gal.
Aviation Gasoline	1.0 gal.

190-proof S.D. Alcohol No. 1 is used in the preparation of the Regular grade of Solox, and 200-proof for the Anhydrous grade.

Properties are as follows:

	Regular	Anhydrous
Specific Gravity (at 60°/60° F.)	0.8158	0.7962
Color	Water White	Water White
Flash Point (approx)	71° F.	71° F.
Coefficient of Expansion (per 1° F.)	0.0006	0.0006
Weight, Lbs. per Gallon (at 60° F.)	6.790	6.630

Because of its unusual solvent powers and its mild, non-residual odor, Solox has found extensive use in a variety of industrial applications. A revised folder, now in preparation, lists many of the most important applications in fields ranging from lacquer formulation to fuel oil conditioning. Copies of this folder may be obtained by writing to U.S.I.

New Method Determines Salts in Crude Oils

NEW YORK, N. Y.—Extensive tests conducted in five laboratories of a large company with headquarters here to determine the most accurate and reproducible method of determining the salt contents of crude oils concomitant with reasonable speed and ease of manipulation have led to a new method, employing hydrochloric acid reflux apparatus.

When the separation of layers after heat application is slow, or an emulsion forms at the interface, the addition of about 5 ml. of butanol and the judicious application of heat is claimed to effect sharp separation. Butanol has broken all emulsions encountered to date.

Carbon Dioxide Useful Against Electrical Fires

The snow and gas discharged from carbon dioxide extinguishers of the first aid type are non-conductive even in the presence of voltages up to 100,000 volts alternating current so long as the extinguisher horns retain their original high dielectric qualities. These facts are the result of an investigation made by engineers of Underwriters' Laboratories, Inc. to determine the electrical conductivity of such extinguishers when fighting fires in or adjacent to high-voltage electrical equipment.

Calcium Separated From Strontium by Use of Acetone

Calcium can be separated from strontium with fairly good results through the use of acetone as a solvent, according to a recent claim. After the two materials have been evaporated to dryness in a nitric acid solution and further dried at 170°, the calcium nitrate is extracted with acetone, in which it is very soluble, then evaporated to dryness and weighed. Strontium nitrate, only slightly soluble in acetone, remains as a residue and can be weighed separately.

Research Workers Uncover New Fields for Starch Esters

PRINCETON, N. J.—A study conducted here reveals that starch esters have potentialities for use in the coating, sizing, and adhesive industries; in the preparation of aqueous emulsions or suspensions of high polymers; and in soft rubberlike plastics.

When using such esters to form either plastics or coatings, dibutyl phthalate is recommended as a plasticizer. For example, it is claimed that a soft plastic with relatively high tack can be made with starch butyrate containing 25% dibutyl phthalate. In coatings, dibutyl phthalate minimizes checking.

Iodine Compounds of Steroids Produced by New Method

BLOOMFIELD, N. J.—A new method has been patented and assigned to a company here for the production of iodine compounds of steroids. The iodo compounds obtained are expected to find application for pharmaceutical use as therapeutic agents and also as intermediate products.

According to the invention, the hydroxy steroids are first converted into esters of true organic sulfonic acids. These are then treated with iodides, preferably in organic solvents such as acetone, at an elevated temperature whereby the corresponding steroid iodides and alkyl or aryl sulfonic acid salts are produced.

Quicker Drying Time Is Claimed for Oils Made by New Method

Better Properties Obtained by Rearrangement of Molecules

What are described as entirely new types of drying oils have been produced from soybean and linseed oils by a molecular rearrangement which introduces conjugated double bonds in place of isolated double bonds in the molecule. Superior drying and bodying properties are among the advantages claimed for these oils.

The soybean oil product is described as drying in half the time required by high quality bodied linseed oil and as gelling under heat tests in a fraction of the time required by the latter. Baking times are said to be equally short and the hardness of the dried films as good as that of dehydrated castor oil. It is reported that there is none of the tackiness of ordinary soybean oil films.

Excellent Color Retention

The color retention of these films, both in the light and in the dark, is described as outstanding, while cooking of varnishes requires less time than corresponding linseed oil varnishes. When dried without adding driers, frosting appears after one or two days.

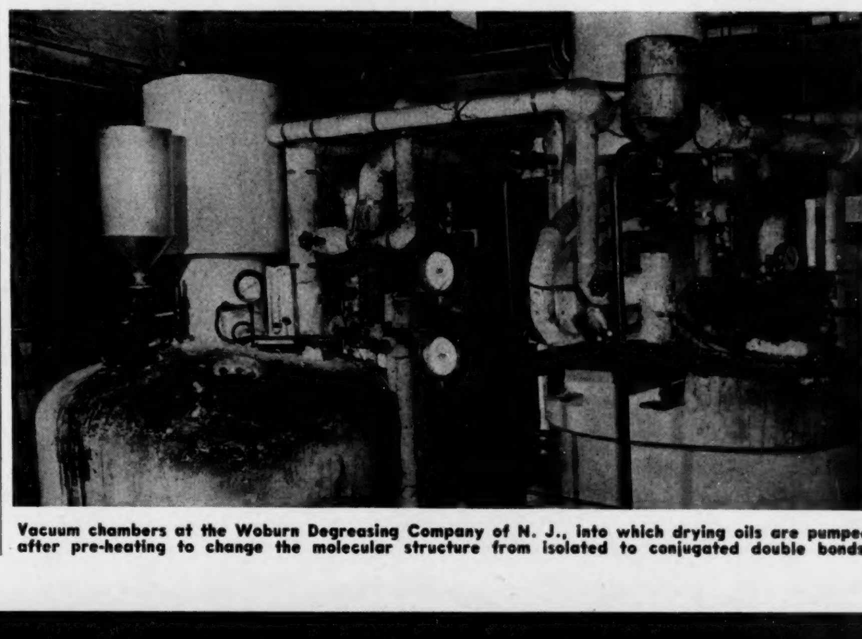
The average constants of conjugated soybean oil are as follows:

Viscosity	Z-3 or Z
Acid Value	5.9
Wijs Iodine Value (400% excess)	97.1
Total Iodine Value (Woburn Method)	128.3
Difference	31.2
Diene Value (Ellis-Jones Method)	17.4
Browne Heat (600° C.)	20 minutes
Specific Gravity (25° C.)	0.9427

Tung Oil Substitute

As the cooking of conjugated linseed oil with resins proceeds very fast, it is expected to offer new possibilities in the problem of replacing tung oil. In producing this oil, the greater part of linoleic and linolenic acid occurring in linseed oil is changed into the isomeric acids containing conjugated double

(Continued on next page)



Vacuum chambers at the Woburn Degreasing Company of N. J., into which drying oils are pumped after pre-heating to change the molecular structure from isolated to conjugated double bonds.

May ★ **U.S.I. CHEMICAL NEWS** ★ 1943

Simple Method Devised to Extract Resin from Shellac

A new method for preparing pure resin from shellac was described recently, which was said to yield about 93% of the total hard resin present in the sample of shellac used.

Two litres of ethyl acetate are added to one pound of finely powdered lac and two litres of benzene added after about five minutes. The whole mass is occasionally stirred for an hour, then the admixed liquid is filtered out by pressing through a cloth or canvas bag. The swelled residue is again treated with a mixture of one litre of ethyl acetate and one litre of benzene to free the mechanically held solvent and the soft resin along with it. The whole is again filtered and pressed in a canvas bag after ten to fifteen minutes and the residue dried in a vacuum oven at 60 to 65°. Finally, the dried mass is melted under water and drawn into fibers.

Soap Deterioration Reduced Through the Use of Acetone

PACKANACK LAKE, N. J.—The addition to a soap composition of a small quantity of a product obtainable by the reaction of an aliphatic ketone compound, such as acetone, with ammonium thiocyanate prevents or greatly reduces deterioration and oxidation of the soap, it is claimed in a patent granted to an inventor here.

In tests the reaction product was mixed in the proportion of .1% with a pure white toilet soap stock containing .07% free sodium hydroxide and 12% moisture. It is said that the antioxidant is neutral in reaction and does not interfere with the estimation of the proper end point of the reaction in the manufacture of the soap.

New Procedure for Making Smoke Without Combustion

LOS ANGELES, Calif. — A new method for making smoke without combustion for use in screening, overcoming riotous crowds, and photography is described in a patent recently awarded to an inventor of this city. The smoke is said to be harmless and can be regulated in density.

In forming the smoke, cyclohexylamine and a volatile, normally liquid organic acid, such as acetic acid, are brought into contact with each other in the presence of atmosphere with either one, or both, in vaporous form. In order to dilute and facilitate evaporation of the amine, ethyl alcohol is added. The weight of the smoke may be varied by adding a volatile liquid of low boiling point such as acetone.

Obtains Higher Resistance In Hectograph Blankets

CHICAGO, Ill. — By incorporating a minor proportion of a glycol solvent in the composition, an inventor here claims that a hectograph blanket can be produced without "burning" that has exceptional heat and humidity resistance and high copy strength.

The following composition is one of several suggested:

	Per cent
Gelatin, bloom strength 220	7
Water	10
Phthalic glycerin resin	1
Glycerin	72
Ethylene glycol	9¾
Formaldehyde (40%)	¼

New Drying Oils

(Continued from preceding page)

bonds. It is available in viscosities ranging from Z up. Tests show striking differences in gelation and drying times between the natural, bodied oil and its conjugated isomer which suggest its advantages for air-drying or baking finishes.

The greater activity of the conjugated double bonds permits cooking this oil with slow resins and gums which are usually not used with linseed oil alone. Frosting is produced when the oil is dried without metals. On baking this oil without driers, it sets and dries faster than either linseed oil or dehydrated castor oil but somewhat slower than oiticica or tung oil. The hardness of the baked film is somewhat greater than linseed oil.

Conjugated Fatty Acids

Another important development from the same laboratories is conjugated fatty acids, isomerized products distinguished from their natural counterparts by the presence of a substantial proportion of conjugated double bonds which are formed by a "shifting" process from the isolated double bonds of linoleic and linoleneic acids. Viscosity can be controlled according to the amount of polymerization taking place during isomerization.

Foremost among the property changes wrought by this molecular rearrangement is said to be a greatly increased speed of polymerization. Others include light color and good color retention at elevated temperatures.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

An alkali cleaner and de-oxidizer for aluminum, copper, nickel and galvanized metal is described as a free-flowing powder form which is readily soluble in water. **(No. 690)**

USI

A vitreous enamel frit is offered which is described as being luminous, phosphorescent and fluorescent. Suggested uses include war purposes, lamp shades, and license plates. **(No. 691)**

USI

A siphon for transferring carboy acids or other dangerous liquids is announced, which is said to eliminate the possibility of carboys bursting, since the pumping action is contained within the siphon, thus creating no pressure in the carboy. **(No. 692)**

USI

A rotary clarification filter has been put on the market which is claimed to incorporate an unusually sturdier leaf design. This leaf is described as producing a uniform tautness of screen, giving longer screen life, and eliminating the customary clamping rings and bolts. **(No. 693)**

USI

A special kettle has been designed for mixing or processing viscous materials, creams or pastes which must be heated and which have a tendency to settle to the sides of a processing vessel. A full steam or hot water jacket surrounds the kettle for heating the contents, it is said. **(No. 694)**

USI

Special cholesterol and sterol products have been developed which are said to be effective stabilizers, emulsifiers, and dispersing agents for such products as drugs, cosmetics, textiles, dyes, and inks. They are described as pale, odorless, semi-solid, non-volatile oils which will not thicken or dry out. Complete solubility in animal, vegetable and mineral oils and ready dispersement in soapy water is claimed. **(No. 695)**

USI

A finish coat in color for masonry has been produced which is claimed not to require priming or an undercoat. The maker says that one coat penetrates, waterproofs, preserves and beautifies masonry whether inside or out. **(No. 696)**

USI

A floor cleaning compound is offered which is said to be so fire-resistant that it will not burn when the flame of a blow torch is played upon it nor as the result of spontaneous combustion. It is further described as highly absorbent of oils and greases. **(No. 697)**

USI

A plastic containing silicon has been developed which is said to combine the advantages of organic and inorganic compounds and which can be used as a solid or a liquid. The solid form has a melting point close to 500° F., it is claimed, while the liquid remains stable in consistency under temperature extremes. Properties can be altered by changing the organic molecules. **(No. 698)**

USI

An adhesive is announced for sealing protective paper to plastic plane parts which is said to offer the following advantages over crude rubber adhesive: better resistance to sunlight with no "cracking-off" from the plastic, slower aging and greater uniformity of quality. **(No. 699)**

BOOKLETS & CATALOGS

Chemicals

A498. *Blackening Metals* including iron and steel, zinc and zinc alloys, copper and copper alloys, and aluminum and its alloys by "Ebonol" method are described in booklet. Gives characteristics of coatings obtained and information on the processes. The Enthone Co.

A499. *"Buna S (Gr-S), Carbon Reinforcement of"* is title of 152-page booklet, fourth in a series on colloidal carbons. This technical treatise is divided into Part 1—Effect of Carbon Surface and Loading on Physical Properties of Buna S; Part 2—Effect of Batch Size and Mixing on Cure and Physical Properties; Part 3—Effect of Mixing and Rest Variations; Part 4—Effect of High and Low Volatile Carbons; Part 5—Flex Crack Growth; Part 6—Summary and Conclusions. According to the company, studies reveal that tensile strength of Buna S reinforced with carbon is improved not by 25% as with natural rubber, but by 600%. Complete with photographs, technical graphs and tables. Columbian Carbon Co.

A500. *"Catalyst Recovery"* is title of booklet which discusses important phases of catalyst recovery, types of equipment best suited to each phase, and their methods of operation. Western Precipitation Corp.

A501. *Chemicals and Acids* are listed in 170-page catalog, which gives percentages of various impurities of C.P. compounds. Catalog No. 36. J. T. Baker Chemical Co.

A502. *Filtrations in Chemical Analysis.* Reference tables for inorganic filtrations list the compound filtered, the types of paper for qualitative and quantitative analyses, and recommendations concerning the use of paper pulp. Handy for laboratory use. Carl Schleicher & Schuell Co.

A503. *Flameproofing* is necessary in combating incendiary weapons used in modern weapons. Eight-page bulletin contains information as to theory of flameproofing as well as specific data on flameproofing of textiles, wearing apparel, paper and structural materials. Glyco Prods. Co.

A504. *Food Research.* "Science at Your Service" is the title of an attractive 16-page brochure for executives, plant managers, advertisers, technologists, and others in the food, drug and cosmetic fields to acquaint them with the scientific services offered by these laboratories. This includes product development, production control, sales promotion, and advertising and labeling in the fields of chemistry, biology, and bacteriology. Well written and use of photographs makes them eye-compelling. Food Research Laboratories, Inc.

A505. *Graphite, Colloidal.* This 12-page bulletin No. 430-T describes physical and chemical properties of "dag" colloidal graphite, emphasizing the importance of particle size. Discusses liquid carriers, controlling dispersions, use of colloidal graphite as lubricant for running-in engines, for high temperatures, for impregnating porous bodies, as a parting compound, and for electrical applications. Apt sketches help tell the story. Acheson Colloids Corp.

A506. *Perfumery, Cosmetics, Soaps.* Raw materials for these products are listed in 28-page bulletin. Includes among other listings synthetic aromatic chemicals, fixatives, perfuming specialities, perfume oils, deodorants, foaming and detergent agents. Van Dyk & Co.

A507. *Scrap Campaign.* Bulletins Nos. 2 and 3 describe case histories of companies in the scrap drive, reports of salvage drives in various industries, and several ideas to help stimulate your company to do an "all-out" salvage drive. Business Press Industrial Scrap Committee.

A508. *Skin Protector* that is claimed to contain a micaceous mineral in a cream base is described in four-page bulletin. AleXitE Engineering Co.

Equipment — Containers

E870. *Clamps, Positive Plate Lifting* are described and illustrated in folder. Merrill Brothers.

E871. *Constant Temperature Control Cabinets* including among others electrically heated ovens for laboratory drying operations, sterilizers, incubators, humidity control cabinets, steam-heated explosion-proof cabinets, and vacuum ovens are described and priced in Catalog 325. Precision Scientific Co.

E872. *Cranes, Tramrails, and Steelweld.* "Cleveland Crane Graphic" Vol. 1 No. 4 discusses new stabilized tramrail carrier, which it is claimed provides proper working height for performing assembly operations and enables keeping a clear floor. Includes data, photographs, and diagrams of Steelweld bending press and cranes. Cleveland Crane & Eng. Co.

E873. *Electrical Equipment.* "Wartime Conservation" is a new 96-page booklet attractively bound and replete with illustrations and pictorial representations of data. It contains recommendations for selecting, applying and using electrical equipment to achieve the best output with the greatest saving in critical materials. The book covers up-rating of motors, thermal temperature loading of transformers, industrial network systems, line equipment and materials, and gives tips on saving and salvaging materials. Tabs make for quick identification of contents. Westinghouse Electric and Mfg. Co.

E874. *Fire Extinguishers.* Booklet gives information on maintenance of vaporizing liquid, soda acid, foam, anti-freeze and carbon dioxide extinguishers. Charts extinguisher and

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engine characteristics, methods of operation, capacity, range of stream. American-La France-Foamite Corp.

E875. "*Hardness*", or "A Critical Examination of Hardness, Dynamic Hardness, and an Attempt to Reduce Hardness to Dimensional Analysis" is the title and subtitle of an engineering treatise of 105-pages. Describes P. Roudie's idea of hardness as a quantity of energy and as function of mass, length, and time. Contains engineering diagrams, graphs and photographs. The Nitralloy Corp.

E876. *Heat Exchangers*, Shellfin, are described in 4-page bulletin. Illustrated with diagrammatic sketches and dimension sheet. Downingtown Iron Works.

E877. *Laboratory Equipment* is cataloged in Bulletin No. 43, Part One. Hundred and twenty-eight pages of apparatus includes dimensions, prices, and descriptions. Illustrated with photographs and diagrams. Schaar & Co.

E878. *Lighting*. Four-page descriptive catalog and price list of Verd-A-Ray bulbs which are said to give light in yellow-green region of spectrum. Save Electric Corp.

E879. *Micromax Pneumatic Control* for regulation of pH, conductivity and other conditions as well as temperature is described in Catalog N-OOB. The controller is said to employ a system of electrical and mechanical balances which detects any departures from control point and changes air pressure to correct them. Catalog gives standard ranges, dimensions, etc. Leeds & Northrup Co.

E880. "*Nitriding Furnaces*" is 99-page practical exposition of their constructional features, capacities, operation and instrumentation. Four parts are: Nitriding and Nitriding Furnaces, Ammonia and its Handling, Determination of Furnace Size for Nitriding, Instruments for Measuring Ammonia Flow. The Nitralloy Corp.

E881. *Pipe Line Filters*, features and advantages, are described and illustrated with photographs and diagrams in Bulletin 1033. Alco Products Div., American Locomotive Co.

E882. *Power Transmission and Materials Handling Equipment* are described in new 180-page General Catalog No. 850 of Standard Equipment. Dimensions, weights, list prices, and other pertinent data are given on chains, sprockets, silent and roller chain drives, bearing, baseplates, take-ups, shafting, couplings, collars, clutches, pulleys, gears, buckets, conveyor idlers, screw conveyor, car spotters, speed reducers. Link-Belt Co.

E883. *Reconditioning Worn Pump Shafts and Rods*. Using worn pump shaft as practical example, the booklet explains and illustrates step-by-step procedures for reconditioning the shaft. Methods used are machining and refinishing, welding, metal spraying, and hard electrodeposition. The International Nickel Co., Inc.

E884. *Safety Equipment for Women* that protects from head to foot is cataloged in four-page folder. Includes leather garments for welding, face shields, hair nets, caps, and gloves. The Boyer Campbell Co.

E885. *Synchronous-Motor Control* of magnetic and semi-magnetic types of full- and reduced-voltage controls are described in GEA-1724D. General Electric Co.

E886. *Timers, Multi-Contact* are covered in engineering bulletin 3000 which lists their applications, construction, standard features, and motor style selection. Complete with tables of torque required and available and wiring diagrams. The R. W. Cramer Co., Inc.

E887. *Transformers*, circular coil, shell type construction for high voltage, small power, chlorextol liquid filled, dry type, secondary network, and instrument transformers are described and illustrated in Bulletin B-6186. Developments treated are electro-cooler for increasing transformer capacity and unit substations to simplify power control and distribution. Allis-Chalmers Mfg. Co.

E888. *Valves, Butterfly*, cast iron flanged, cast iron with American Standard flanges, 125 lb. American Standard cast iron-hand lever, hand wheel and chain wheel butterfly valves, precision machined and wedge tight, are cataloged in Bulletin No. 10-B. Supplemented with photographs of the equipment, descriptive sketches, and valve velocity and flow charts. R-S Products Corp.

E889. *Ventilators for Roofs* made of non-critical materials are listed in Bulletin 217. Several of the new designs parallel closely the original styles made of steel and are said to give the same performance. Materials used are sheets of non-metallic fibers and pressed wood for stationary ventilators, and unit heat, powered heat, and continuous heat valves. The Swartwout Co.

E890. *Vibration Insulators* whose permanence depends upon the vulcanized bond between rubber and metal are listed in Catalog section 7900, 4-41. Vibro-Insulators are designed to carry a load in shear, as rubber in shear is said to have greater properties of absorbing vibration and reducing noise than when in compression. Includes engineering sheet, diagrams. B. F. Goodrich Co.

E891. *Welders' Safety Clothing* to protect against molten metal sparks is listed in new catalogue. The book is particularly valuable, according to the company, because it informs the welder as to the type of protective clothing he needs for any particular job. Contains hints on how to break in safety clothing to get maximum service and wear. American Optical Co.

E892. *Welding*. History of welding from the cave man's hollow log to most recent innovations in welded piping is told in an interesting, and attractively illustrated house organ. Spring issue of "Sparks." Tube Turns.

E893. *Welding Accessories* or what the fully protected female welder will wear—leather welding jackets, special flame-proofed hats, etc. Emphasizes attractiveness and lightness of arc welding clothing. GEA-3295. General Electric Co.

* * * * * * * * * * * * * * * *

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A498	A507	E877	E886	QC244
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A500	E870	E879	E888	QC246
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A502	E872	E881	E890	QC248
A503	E873	E882	E891	QC249
A504	E874	E883	E892	QC250
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and acids were moved out during May for military and civilian manufacture, and supply positions tightened materially in some of these.

Bichromates found themselves in a more difficult position owing to the demands upon chrome, metallurgical and chemical. Second quarter allocations of acetic anhydride were allowed up to 96 per cent for cellulose acetate yarn, plastics and film; in full for staple acetate fiber, acetobutyrate, pharmaceuticals, and dye intermediates.

April-May shipments of soda ash ran into a considerable tonnage, and some difficulty was encountered in filling small-lot orders due to labor and transportation shortages. Chlorine production by the industry was fully up to and, in some instances, in excess of demand although it was thought that new plants now under construction would absorb the difference.

Mineral acids were shipped in heavy volume to war plants, and it was reported that some producers of oxalic acid had sold their output several months ahead. Scarcity made for some price-rocketting in hydrated lime. It was reported that up to $18 and $20 per ton had been asked by resellers as against manufacturers' listed quotations of $9 to $11.

Arsenic allocations for the first half of 1943 will equal 55 per cent of 1941-1942 average consumption; for the second quarter this year were granted in full for such needs as metallurgy, dyestuffs, gas purification, arsenicals.

Coal Tar Products: Arrangements were completed between the Washington and London governments for the importation of British tar acids which are urgently required for certain resins and munitions. The plan which may be administered here by the Defense Supplies Corp. and in Britain by a sales agency under the British Coal Tar Controller, provides for the importation of the duty-free tar acids usually brought in, and in addition ortho-cresol, metapara-cresol, and certain crude tar acids not heretofore imported in quantity. The War Production Board and the Board of Economic Warfare sought to make use of established importers for handling these shipments. Previously, cresylic acid had arrived in large volume under recently established OPA price regulations.

Phenol continues to be taken in considerable quantities for resins and explosives, also for Lend-Lease shipments to a European Ally. Only 25 per cent was granted to "chemical manufacture" in the April allocations, dyestuffs 40 per cent. and salicylates 70 per cent.

Naval Stores: The market was featured by a material expansion in the sale of wood turpentine which has been available for some time at carlot prices of 9c to 10½c per gallon below gum turpentine. At the start of May, steam distilled wood turps were quoted at 59c per gallon, New York, while gum turpentine ruled at 69½c. At the beginning of April these commodities were, respectively, 61c and 70c. The wood product, obtained in destructive distillation of pine woods, is said to be in active competition with turpentine produced as a byproduct of pulp manufacture.

Fine Chemicals: The War Production Board estimated that alcohol supplies for 1943 would amount to 470,000,000 gallons, and that our requirements would total 435,000,000 gallons. For 1944 it was figured that alcohol supplies and total needs would about balance at 590,000,000 gallons. The Government last month, in the face of threatened farm opposition, scrapped its plan for expanding alcohol production from grain, and five plants which had been authorized in the grain-producing sections for this purpose were deferred.

In the face of mounting wartime costs and prices, synthetic vitamin manufacturers were able to effect further price reductions. Both Vitamin B-1 (thiamin hydrochloride) and Vitamin B-2 (riboflavin) were lowered 5c per gram. Some factors in the vitamin manufacturing field are understood to favor a kilo basis for quotations instead of the gram. Thiamin is now 32c, and riboflavin 53½c per gram.

Brazilian menthol is arriving here to allay the shortage arising from suspension of Japanese imports.

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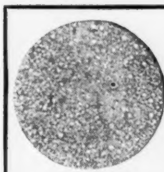

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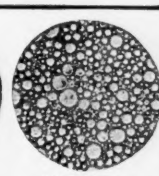

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LEGAL ADVENTURES OF A CHEMIST

4. Case of the Fraudulent Crucible

"WELL, it was this way," Chemist Smith commenced. "A certain salesman came into my office just three months ago with a proposition to sell me a $5,000 crucible. Well, to make a long story a little longer, we signed a contract to that effect, but that contract was one of his own writing and make."

"And, I suppose, you just glanced over it, noted dates and such, and took the rest for granted," Smith's attorney interposed.

"Oh, that part of it was all right, I made sure of that," Smith assured him.

"Did he deliver it within the time specified? And was it up to specifications in every way?"

"It sure was."

"Well, what do you want of me?"

"What do I want of you? That salesman made me believe he was the only guy on the road who could sell that type of crucible or anything like it, and I've found that I could'a got it in dozens of places 10 per cent cheaper," Smith exploded.

"Then, I suppose you want me to enter suit against the jobber for damages?"

"Yes, I want you to, but as far as I can see it is impossible. Just a clause in the contract that I failed to read," Smith admitted. "A clause that prohibits me from entering suit for fraud for six months after date of the contract."

"If that's all, you have nothing to worry about," the lawyer consoled, removing a large volume of reports from a nearby bookcase.

"Yes, here it is, Granlund vs. Saraf, 160 N.E. 408, where the Court said:

"'Attempts under the form of a contract to secure total or partial immunity from liability for fraud are all under the ban of the law. The extent of the relief granted to the injured party, in order to adequate, cannot be restricted by the act of the parties.'"

"I'm luckier than I deserve," Chemist Smith agreed.

5. Case of the Unordered Surplus

CHEMIST SMITH was short just 10,000 gallons of industrial alcohol for a special purpose, and bought that quantity from an up-river distiller at a satisfactory price.

"I'll ship out today and you will get it day after tomorrow," the jobber agreed.

"We have 13,000 gallons of alcohol billed to you," the freight agent telephoned two days later.

"To me? There must be some mistake. Who's it from?"

The freight agent gave the name of the obliging distiller.

"I ordered only 10,000 gallons, and have no use for the balance. I refuse delivery, and you can tell him so," was Smith's reaction, and the distiller went to law.

"But where the seller knowingly sends more or less than the quantity ordered, he is guilty of an intentional violation of the contract which he undertakes to perform, and his conduct savors of bad faith; and it would seem that he has no right to presume that the purchaser will accept, or to rely on notice of refusal," said the Wisconsin courts in ruling in Chemist Smith's favor.

The case is reported in full as Barton vs. Kane in 17 Wisconsin 37, and also in 84 Am. Dc. 728.

Paint Freight Rates

Office of Price Administration is pushing a fight before the Interstate Commerce Commission against a pending increase in freight rates for paints and paint materials between certain northwest and western points, with a brief scheduled to be filed before May 20.

Washington

(*Continued from page 552*)

economy report, is reduced to an advisory capacity, if he remains in the organization. The new vice chairman in charge of civiliian supply requirements, Arthur D. Whiteside, has much wider powers than the press reports indicate. Programs from the industry branches must go over his desk, and if they appear to make too deep inroads in the waning civilian materials, he can make revisions. There is a question if he can make these revisions stick, which only time can answer.

A rampant Congress not entirely willing to leave the matter there, is moving to establish an entirely independent civilian requirements office, with equal rank to older claimant agencies. The index to the probable policy of such an organization is to be seen in the Office of Price Administration, where the legislators forced the appointment of a former colleague, Prentiss Brown, and where a much less Spartan outlook becomes more apparent daily.

Meanwhile, it is a question how far readjustments can be made. Despite the tendency to cut-back certain production plans, the latest distribution of chemicals reported by WPB shows that over 47 percent of April allocations entered into identifiable military production, compared with 42 percent in March.

Moreover, the latest list of strategic materials shows many chemicals in an increasingly critical category; bismuth, most vegetable oils, monoethanolamine, butyl alcohol, all isomers, phthalate plasticizers, charcoal, citric acid, chlorates, perchlorates, among others. The WPB is now recording periodically the relative supplies also, of insecticides and fungicides, reflecting the official concern with food production, and vinsol, methyl ethyl ketone, nicotinic acid, styrene, diethanolamine, and others.

The need for chemicals is reflected in various directions. The Salvage division of WPB is pushing a program initiated some months ago, for reclamation of chemical solvents and other products. The current effort is designed to check the efficiency of chemical by-product recovery at various plants and industries. Where improvement is suggested, it is planned to provide technical services and other help.

Tartrates

Domestic tartrates are replacing imports. During 1942 approximately 5,000,000 pounds were recovered from domestic sources. This is expected to reach 10,000,000 pounds during 1943, which compares with 1941 domestic consumption of 14,700,000 pounds. Nearly all U.S. requirements were imported prior to the war.

This suggests an aspect of the current flurry over renewal of the Reciprocal Trade Agreement program, legal authority for which terminates in June unless Congress extends the legislation. The present effect of these agreements on American industry is obscured by the war situation, so that the primary concern in the present argument is the effect they will have carried into the post-war period.

Will the United States continue its present attempts at self-sufficiency, as in the case of tartrate production, or more vitally, in the case of its expanding synthetic rubber output? (On the latter point, see *Between the Lines*, this issue.) If so, considerable revision of these agreements would appear to be indicated.

In fact, debate on the treaties shows that many members of Congress already are concerned over the possibility that when the emergency is over, if the present administration is in power, the reciprocal trade powers, coupled with their authority over war-built synthetic rubber plants, will be a threat to the budding $1,000,000 domestic rubber industry.

Transportation: A general WPB order is shaping up to supplement the tank-car order, which will apply to freight cars used by chemical shippers. It will ask voluntary industry cooperation in conservation of space.

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Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00 April 1941 $1.117 April 1942 $0.946 April 1943 $0.893

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Acetaldehyde, 99%, drs. wks. lb	...	.11		.11	.11	.11
Acetic Anhydride, drs. c-l, lb.	...	.11½	.11½	.11½	.11½	.13
Acetone, tks, delv (*PC*) . . lb.	...	.07	...	.07	.07	.158
ACIDS						
Acetic, 28%, bbls (*PC*) 100 lbs.	3.38	3.63	3.38	3.63	3.38	3.63
glacial, bbls. . . . . . . 100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
tks, wks . . . . 100 lbs.	6.25	6.93	6.25	6.93	6.25	6.93
Acetylsalicylic, USP, (*PC*)						
Standard USP . . . . lb.	...	.40	...	.40	.40	.40
Benzoic, tech, bbls . . . . . . lb.	.43	.47	.43	.47	.43	.47
USP, bbls . . . . lb.	.54	.59	.54	.59	.54	.59
Boric, tech, bbls, c-l, . . . ton *a*	...	109.00	...	109.00	108.00	109.00
Chlorosulfonic, drs. wks . lb.	.03	.04½	.03	.04½	.03	.04½
Citric, crys, gran, bbls, c-l lb. *b*	.20	.25	.20	.25	.20	.21
Cresylic 50%, 210-215° HB,						
drs, wks, frt equal (A) gal.	.81	.83	.81	.83	.81	.86
Formic, tech, cbys . . . . lb.	.10½	.11½	.10½	.11½	.10½	.11½
Hydrofluoric, 30% cbys . . lb.	...	.09	...	.09	.06	.06½
Lactic, 22%, lgt, bbls wks lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls wks . . lb.	.073	.0755	.073	.0755	.073	.0755
Maleic, Anhydride, drs lb.	.25	.26	.25	.26	.25	.26
Muriatic, 18° cbys . . . 100 lb.	1.50	2.45	1.50	2.45	...	...
20° cbys, c-l, wks . . 100 lb.	...	1.75	...	1.75	1.75	1.75
22° cbys, c-l, wks 100 lb.	...	2.25	...	2.25	2.25	2.25
Nitric, 36°, cbys, wks 100 lbs. *c*	...	5.00	...	5.00	5.00	5.00
38°, c-l, cbys, wks 100 lbs. *c*	...	5.50	...	5.50	5.50	5.50
40°, c-l, cbys, wks 100 lbs. *c*	...	6.00	...	6.00	6.00	6.00
42°, c-l, cbys, wks 100 lbs. *c*	...	6.50	...	6.50	6.50	6.50
Oxalic, bbls, wks (*PC*) . lb.	.11¼	.12½	.11¼	.12½	.11¼	.14½
Phosphoric, 75% USP, . . lb.	.10½	.13	...	.12	.12	.12
Salicylic, tech, wks (*PC*) . . lb.	.26	.42	.26	.42	...	.33
Sulfuric, 60°, tks, wks . . ton	...	13.00	...	13.00	...	13.00
66°, tks, wks . . . . ton	...	16.50	...	16.50	...	16.50
Fuming (Oleum) 20% tks.						
wks . . . . ton	...	19.50	...	19.50	...	19.50
Tartaric, USP, bbls . . . . . . lb.	...	.70½	...	.70½	...	.70½
Alcohol, Amyl (from Pentane)						
tks, delv . . . . lb.	...	.131	...	.131	...	.131
Butyl, normal, tks (*PC*) lb.	.10¾	.14¼	.10¾	.14¼	.10¾	.168
Denatured, CD, 14, c-l						
drs, (*PC, FP*) . . . . gal. *d*	...	.54½	...	.54½	...	.65
Denatured, SD, No. 1, tks. *d*	...	.50	...	.50	...	.53
Ethyl, 190 proof tks . . . . gal	...	11.90	11.90	11.92	8.12	11.92
Isobutyl, ref'd, lcl, drs lb.	...	.086	...	.086	...	.086
Isopropyl, ref'd, 91% gal.	.39	.43½	.39	.43½	.40½	.43½
Propyl, nor, drs, wks gal.	.67	.70	.67	.70	.69	.75
Alum, ammonia, lump, c-l,						
bbls, wks . . . . 100 lb.	...	4.25	...	4.25	...	4.25
Aluminum metal, (*FP*) 100 lb.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd 99% wks lb.	.08	.12	.08	.12	.08	.12
Hydrate, 96% light, (A) lb.	...	.15	...	.14½	...	.14½
Sulfate, com, bgs, wks 100 lb.	1.15	1.25	1.15	1.25	1.15	1.25
Sulfate, iron-free, c-l, bgs,						
wks . . . . 100 lb.	1.75	1.85	1.75	1.85	1.75	1.85
Ammonia anhyd, 100 lb cyl lb.	...	.16	...	.16	...	.16
Ammonium Carbonate,						
lumps, dms . . . . lb.	.08½	.09¼	.08¼	.09¼	.08¼	.09¼
Chloride, whi, bbls, wks, 100 lb.	4.45	5.15	4.45	5.15	4.45	...
Nitrate, tech. bags. wks. lb.	.0435	.0850	.0435	.0850	.0435	.0455
Oxalate pure, grn, bbls . . lb.	.27	.33	.27	.33	.27	.33
Perchlorate, kgs (A) . . . lb.	.55	.65	.55	.65	.55	.65
Phosphate, dibasic tech,						
powd, 325 lb bbls . . . lb.	...	.07¼	...	.07¼	.09¼	.09¼
Stearate, anhyd, bbls . . . lb.	...	.24½	...	.24½	...	.24½
Sulfate, f.o.b., bulk (A) ton	28.20	29.20	29.00	30.00	29.00	30.00
Amyl Acetate (from pentane)						
c-l, drs, delv . . . . lb.	...	.155	...	.155	...	.155
Aniline Oil, drs and tks . . lb.	.12½	.16	.12½	.16	.12½	.16
Anthraquinone, sub, bbls . . lb.	...	.70	...	.70	...	.70
Antimony Oxide, 500 lb.						
bbls (A) . . . . lb.	.15	.15½	.15	.15½	.15	.16½
Arsenic, whi, kgs (A) . . . . lb.	.04	.04¾	.04	.04¾	.04	.04¾
Barium Carbonate precip,						
200 lb bgs, wks . . . . ton	55.00	65.00	55.00	65.00	55.00	65.00
Chloride, delv, zone 1 . . ton	77.00	92.00	77.00	92.00	77.00	92.00

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; *y* Price given is per gal; *c* Yellow grades 25c per 100 lbs. less in each case; *d* Prices given are Eastern schedule. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric is ½c higher;

Current Prices

Barytes
Gums

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Barytes, floated, bbls. c-l ton	...	27.65	...	27.65	...	27.65
Bauxite, bulk mines (A) ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde, tech, cbys, dms lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	(A)	.15	(A)	.15	...	.15
Benzyl Chloride, 95-97% . . lb.	.22	.24	.22	.24	.22	.24
Beta-Naphthol, bbls, wks . . lb.	.23	.24	.23	.24	.23	.24
Bismuth metal, ton lots . . . lb.	...	1.25	...	1.25	...	1.25
BlancFixe, Pulp, bbls, wks ton *h*	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks, 100 lb.	2.50	3.10	2.50	3.10	2.25	3.10
Borax, tech, c-l, bgs . . . . ton *i*	...	45.00	...	45.00	45.00	46.00
Bordeaux Mixture, drs . lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases . . lb.	.25	.30	.25	.30	.25	.30
Butyl, acetate, norm drs, lb.	.124	.1675	.124	.1675	.124	.168
Cadmium Metal (*PC*) . lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs. 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs (A) c-l . . . . lb.	...	.04¾	...	.04¾	...	.04¾
Carbonate, tech, c-l bgs, ton	18.00	22.00	16.00	20.00	16.00	20.00
Chloride, flake, bgs . . . . ton	18.50	25.50	18.50	25.00	...	21.00
Solid, 650 lb drs, c-l, . . ton	18.00	31.50	18.00	34.50	18.00	34.50
Gluconate, Pharm, drs . . lb.	.52	.59	.52	.59	.52	.59
Phosphate, tri, bbls . . . . lb.	.0635	.0785	.0635	.0705	.0635	.0705
Camphor, slabs . lb.	.85	.90	.85	1.65	1.60	1.65
Carbon Bisulfide, 55-gal drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, Liq, 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, (*FP*) (*PC*) drs, c-l . . . . lb.	.73	.80	...	.83	.73	.83
Casein, Standard, Dom, grd lb.	.21	.23¼	.21	.23¼	.15	.30½
Chlorine, cyls, lcl, wks, contract (*FP*) (A) . . . lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract . . lb. *j*	...	.05¼	...	.05¼	...	.05¼
Liq, tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Chlorobenzene, Mono, wks lb.	.05½	.09	.05½	.09	.05½	.09
Chloroform, tech, drs . . . . lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls . . . . . bbl.	8.25	9.25	8.25	9.25	7.50	9.25
Cobalt Acetate, bbls (A) lb.	...	.83¾	...	.83¾	...	.83¾
Oxide, black kgs (A) . . lb.	...	1.84	...	1.84	...	1.84
Copper, metal *FP*, *PC* 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls lb.	.19½	.20	.18	.20½	.18	.20½
Sulfate, bbls, wks(A) 100 lb.	5.00	5.50	5.00	5.50	5.15	5.50
Copperas, bulk, c-l, wks . . ton	...	14.00	...	14.00	...	17.00
Cresol, USP, drs, (A) . . . . lb.	.10¾	.11¼	.10¾	.11¼	.10¾	.11½
Cyanamid, bgs, c-l, frt (A) nitrogen basis . . . . ton	1.52½	1.62½	1.52½	1.62½	no prices	
Dibutylamine, c-l, drs. wks lb.	...	.61	...	.61	.50	.61
Dibutylphthalate, drs . . . . . lb.	.20	.212	.21	.23½	.21	.23½
Dichlorethylene, drs . . . . . lb.	...	.25	...	.25	...	.25
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, c-l, drs lb.	...	.037	...	.037	...	.037
Diethylamine, drs, wks . . . lb.	...	.81	...	.81	.70	.81
Diethylaniline, lb drs . . . . lb.	...	.40	...	.40	...	.40
Diethylphthalate, c-l, drs . . lb.	.212	.217	.212	.217	.21½	.22
Diethyleneglycol, drs lcl. wks. lb.	.14	.15½	.14	.15½	.14	.15½
Diethylene oxide, 50 gal drs, wks . . . . lb.	.20	.24	.20	.24	.20	.24
Dimethylaniline, dms., cl., lcl. lb.	.23	.24	.23	.24	.23	.24
Dimethyl phthalate, drs . . lb.	.1970	.2050	.1970	.2050	...	.20
Dinitrobenzene, bbls . . . . . . lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls . . . . . . lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms . . . . . . lb.	.	.18	.	.18	...	.18
Diphenyl, bbls lcl. wks . . . . lb.	.15	.20	.15	.20	.15	.16
Diphenylamine bbls . . . . . . lb.	. .	.25	. .	.25	.	.25
Diphenylguanidine, drs . . . lb.	.35	.37	.35	.37	.35	.37
Ether, Isopropyl, drs . . . . lb.	.07	.08	.07	.08	.07	.08
Ethyl Acetate, 85% Ester tks, frt all'd . lb.	.107	.110	.107	.110	.11	.12
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Chloride, drs . . . . lb.	.18	.20	.18	.20	.18	.20
Ethylene Chlorhydrin, 40% lb.	.75	.85	.75	.85	.75	.85
Anhydrous frt all'd . . lb.	...	.75	...	.75	...	.75
Dichloride, cl wks . . . . drs, E. Rockies dms, cl. . . lb.	...	.0842	...	.0842	...	.0742
Glycol, dms, cl. . . . . lb.	...	.15½	...	.15½	.14½	.18½
Oxide, cyl . . . . lb.	.50	.55	.50	.55	.50	.55
Ferric Chloride, tech, bbls . lb.	.05	.08	.05	.07½	.05	.07½
Fluorspar, 85.5% c-l, (*PC*) ton	25.00	28.00	25.00	28.00	28.00	34.00
Formaldehyde, c-l, bbls, wks (*FP*, *PC*) . . . . . . lb.	.055	.0575	.055	.0575	.055	.0575
Furfural (tech) drs, c-l. wks lb.	. .	.12½	. .	.12½	. .	.12½
Fusel Oil, refd, dms, dlvd lb.	.18½	.19½	.18½	.19½	.18	.19½
Glauber's Salt, bgs, wks 100 lb.	1.05	1.25	1.05	1.25	1.05	1.28
Glycerin (*PC*) CP, drs, c-l, lb.	...	.18¾	...	.18¾	...	.18¼
Saponification, drs, c-l . . lb.	...	.12¾	...	.12¾	...	.12¾

GUMS

GumArabic, amber sorts bgs lb.	.19½	.20½	.19½	.20½	.14½	.24
Benzoin Sumatra, CS . . . . lb.	.60	.65	.60	.65	.45	.55
Copal, Congo, opaque . . . . lb.	...	.49½	...	.49½	...	.49½
Copal, East India, 180 lb bgs						
Macassar pale bold . . . . lb.	...	.17⅜	...	.17⅜	...	.17⅜
Singapore, Bold . . . . . . lb.	...	.22⅜	...	.22⅜	...	.22⅜
Copal Manila, (A)	...	.15⅛	...	.15⅛	.14	.14½
Copal Pontianak, bold (A) lb.	.	.22⅜	...	.22⅜	.22⅜	.22⅜
Ester . . . . lb.	.09½	.12	. .	.10	.08½	.10
Ghatti, sol, bgs . . . . lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls, bxs, drs . . . lb.	.14	.33	.14	.33	.14	.33

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

h Lowest price is for pulp; highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case;

Current Prices

		Current Market		1943 Low	1943 High	1942 Low	1942 High
Kauri, N Y (A)							
Brown XXX, cases	lb.	...	.77	...	.77	.60	.77
B3	lb.	...	.22	...	.27½	.18½	.27½
Pale XXX	lb.	...	.65¾	...	.66	.61	.66
No. 3	lb.	...	.22	...	.22	.17¾	.22
Sandarac, prime quality	lb.	...	.97½	.95	.97½	.95	1.10
Tragacanth, No. 1, cases	lb.	4.00	4.25	4.00	4.25	3.50	4.00
No. 3	lb.	1.10	1.20	1.10	1.20	1.10	1.20
Yacca, bgs (*PC*)	lb.	.06	.07¼	.06	.07¼	.06	.07¼
Hydrogen Peroxide, cbys	lb.	.16	.18½	.16	.18½	.16	.18½
Iodine, Resublimed, jars	lb.	...	2.00	...	2.00	...	2.00
Lead Acetate, cryst, bbls	lb.	...	.12½	...	.12½	.12	.13¼
Arsenate, c-l	lb.	.11½	.12	.11½	.12	.11	.12
Nitrate, bbls	lb.	...	.12½	...	.12½	.11	.14
Red, dry, 95% Pb_3O_4, lcl	lb.	.09½	.10½	.09½	.10½	.09	.10¼
97% Pb_3O_4, bbls delv	lb.	.09½	.10¼	.09½	.10¼	.09¼	.09½
98% Pb_3O_4, bbls delv	lb.	.09¾	.10¾	.09¾	.10¾	.09½	.10½
White, bbls, lcl	lb.	.08½	.08¾	.08½	.08¾	...	.07½
Basic sulfate, bbls, lcl	lb.	.07½	.08	.07½	.08	.06½	.07½
Lime, Chem., wks, bulk	ton	6.25	13.00	6.25	13.00	7.00	13.00
Hydrated, f.o.b. wks	ton	8.50	16.00	8.50	16.00	8.50	16.00
Litharge, coml, delv, bbls	lb.	.08	.09¼	...	.08	.079	.08
Lithopone, ordi., (*PC*), bgs	lb.	...	.04¼	...	.04¼	...	.04¼
Magnesium Carb, tech, wks	lb.	.06¼	.09½	.06¼	.09½	...	.06¼
Chloride flake, bbls, wks c-l	ton	...	32.00	...	32.00	...	32.00
Manganese, Chloride, bbls	lb.	.13	nom.	.13	nom.	.13	.14
Dioxide, tech bgs, lcl	ton	70.00	73.00	...	74.75	70.00	74.75
Sulfate, tech, 90-95% drms,	ton *l*	.11¼	.11½	.11¼	.11½	.10½	.11½
Methanol, pure, nat, drs	gal *l*	.63	.76	.63	.76	.55½	.61½
Synth, pure, drs	gal. *m*	.34½	.40½	.34½	.40½	.34½	.40½
Methyl Acetate, tech tks	lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv	lb.	.09½	.10½	.09½	.10½	.09½	.10½
Chloride, 90 lb cyl	lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone, tks, frt all'd	lb.	...	.08	...	.08	...	.08
Naphtha, Solvent, tks	gal.	...	.27	...	.27	...	.27
Naphthalene, crude, wks	lb.	2.75	3.00	2.75	3.00	2.50	3.00
Nickel Salt, bbls, NY	lb.	.13	.13½	.13	.13½	.13	.13½
Nitre Cake, blk	ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, drs, wks	lb.	.08	.09	.08	.09	.08	.09
Orthoanisidine, bbls	lb.	...	.70	...	.70	...	.70
Orthochlorophenol, drs	lb.	...	.32	...	.32	...	.32
Orthodichlorobenzene, drms	lb.	.06	.08½	.06	.08½	.06	.07½
Orthonitrochlorobenzene, wks	lb.	.15	.18	.15	.16	.15	.18
Orthonitrophenol, drs	lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, wks	lb.	...	.09	...	.09	...	.09
Para aldehyde, 99%, wks	lb.	...	.12	...	.12	...	.12
Aminophenol, 100 lb kgs	lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs	lb.	...	.32	...	.32	...	.32
Dichlorobenzene, wks	lb.	.11	.15	.11	.15	.11	.12
Formaldehyde, drs, wks (*FP*)	lb.	.23	.24	.23	.24	.23	.24
Nitroaniline, wks	lb.	...	.45	...	.45	...	.45
Nitrochlorobenzene, wks	lb.	...	.15	...	.15	...	.15
Nitrophenol, 185 lb bbls	lb.	...	.35	...	.35	...	.35
Penetaerythritol, tech, del	lb.	.33½	.35½	.33½	.35½	.33½	.35½
Toluenesulfonamide, bbls	lb.	...	.70	...	.70	...	.70
Toluidine, bbls, wks	lb.	...	.48	...	.48	...	.48

PETROLEUM SOLVENTS AND DILUENTS

		Current Market		1943 Low	1943 High	1942 Low	1942 High
Lacquer diluents, tks, East Coast	gal.	...	.11	...	.11	...	.11
Naphtha, V.M.P., East tks, wks	gal.	...	.11	...	.11	.10½	.11
Petroleum thinner, 43-47, East, tks, wks	gal.	.08¾	.09½	.08¾	.09½	.08¾	.09½
Rubber Solvents, stand grd, East, tks, wks	gal.	...	.11	...	.11	.10½	.11
Stoddard Solvents, East, tks, wks	gal.	...	.09½	...	.09½	...	.09½
Phenol, 250-100 lb drs (A)	lb.	.10½	.11¼	...	.12½	.12½	.13
Phthalic Anhydride, bbls wks (A)	lb.	.14½	.15½	.14½	.15½	.14½	.15½
Potash, Caustic, wks, sol	lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake	lb.	.07	.07½	.09	.07½	...	.07
Potassium Bichromate csks *(*FP*)	lb.	.09⅝	.10	...	.09⅝	...	.09⅝
Bisulfate, 100 lb kgs	lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 83-85% calc	lb.	.05½	.05¾	.05½	.05¾	.06½	.06¾
liquid, tks	lb.	...	.0275	...	.0275	...	.0275
dms, wks	lb.	.03	.03⅛	.03	.03⅛	.03	.03⅛
Chlorate crys, kgs, wks (A)	lb.	.11	nom.	nom.	.11	nom.	.11
Chloride, crys, bgs, kgs	lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks	lb.	...	.55	...	.55	...	.55
Iodide, bots., or cans	lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriate, bgs, dom, blk unit	ton	.53½	.56	.53½	.56	.56	.58
Permanganate, USP, crys wks (*FP*) dms	lb.	.20½	.21	.20½	.21	.19¾	.21
Sulfate, 90% basis, bgs	ton		36.25		36.25		36.25
Propane, group 3, tks (*PC*)	gal.	.03¼	.03¾	.03¼	.03¾	.02¾	.03¾
Pyridine, ref., drms	lb.	...	.46	...	.46	...	.46
R Salt, 250 lb bbls, wks	lb	...	.55	...	.55	...	.55
Resorcinol, tech., drms, wks	lb.	.68	.74	.68	.74	.68	.74
Rochelle Salt, cryst	lb	.43½	.47	.43½	.47	...	.43½
Salt Cake, 94-96%, wks	ton	...	15.00	...	15.00	...	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.

* Spot price is ⅛c higher.

Current Prices

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Saltpetre, grn, bbls ...... lb.	8.20	8.60	8.20	8.60	...	8.20
Shellac, Bone dry, bbls .. lb. r	.42½	.46	.42½	.46	.39	.42½
Silver Nitrate, vials ..... oz.	...	.32⅜	...	.32⅜	.26⅞	.32⅜
Soda Ash, 58% dense, bgs,						
c-l, wks .... 100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs .... 100 lb.	1.05	1.13	1.05	1.13	1.05	1.13
Caustic, 76% grnd						
drms .... 100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drms .. 100 lb.	...	2.30	...	2.30	...	2.30
Liquid, sellers tks 100 lb.	...	1.95	...	1.95	...	2.00
Sodium Acetate, 60% tech,						
powd, flake, bbls, wks lb.	.05	.06	.05	.06	...	.05
Benzoate, USP bbls .... lb.	.46	.52	.46	.50	.46	.50
Bicarb, bbl, wks .... 100 lb.	1.70	2.05	1.70	2.05	1.70	1.85
Bichromate, cks, wks (*FP*) lb.	.	.07⅜	...	.07⅜	...	.07⅜
Bisulfite, 500 lb bbls, wks lb.	3.00	3.60	3.00	3.60	3.00	3.10
35-40% solbbls, wks 100 lb.	1.40	1.65	1.35	1.80	1.35	1.80
Chlorate, bgs, wks (A) .. lb.	...	.06¼	...	.06¼	...	.06¼
Cyanide, 96-98%, wks .. lb.	.14	.15	.14	.15	.14	.15
Fluoride, 95%, bbls, wks lb.	.08¼	.09¼	.08¼	.09¼	...	.08
Hyposulfite, bbls, wks 100 lb.	...	2.45	...	2.45	...	2.45
Metasilicate, wks .. 100 lb.	...	2.50	...	2.50	...	2.50
Nitrate, crude, bgs (A) ton	...	33.00	...	33.00	...	29.35
Nitrite, 500 lb bbls .... lb.	...	.06¾	...	.06¾	...	.06¾
Phosphate, di- wks						
cryst, bgs, c-l .... 100 lb.	2.55	2.70	2.55	2.70	2.55	2.70
Tri-bgs, wks ..... 100 lb.	2.70	3.45	2.70	3.40	2.70	2.85
Prussiate, yel, bbls, wks lb.	.10	.11	.10	.11	...	.11
Pyrophosphate, bgs wks c-l lb.	.0528	.0610	.053	.061	.053	.06
Silicate, 52°, drs. wks 100 lb.	1.40	1.80	1.40	1.80	...	1.70
40°, drs, wks .... 100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY .. lb.	.05	.05½	.05	.05½	.09	.15
Sulfate, Anhyd, bgs 100 lb.	1.70	1.90	1.70	1.90	1.70	1.90
Sulfide, c-l, bbls, wks .. lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, c-l, wks .. lb.	3.15	3.90	3.15	3.90	...	3.15
Sulfite, powd, bbls, wks lb.	.05¼	.06	.05¼	.06	...	.05¼
Starch, Pearl, bgs .... 100 lb.	...	3.47	...	3.47	...	3.10
Potato, bgs .... lb.	...	.0637	...	.0637	.061	.0637
Rice, bgs .... lb.	.09½	.10¼	.09½	.10¼	.09	.10
Sweet Potato, bgs .. 100 lb.	no stocks		no stocks		no stocks	
Sulfur, crude, f.o.b. mines ton	...	16.00	...	16.00	...	16.00
Flour, USP, bgs ... 100 lb.	3.05	3.35	3.05	3.35	...	...
Flowers, bgs ...... 100 lb.	3.30	4.15	3.30	4.15	3.05	3.35
Roll, bbls .... 100 lb.	2.40	2.90	2.40	2.90	2.40	2.70
Sulfur Dioxide, cyl ...... lb.	.07	.08	.07	.08	.07	.09
tks, wks .... lb.	.04	.06	.04	.06	.04	.06
Sulfuryl Chloride .... lb.	.15	.40	.15	.40	.15	.40
Talc, crude, c-l, NY .... ton	...	13.00	...	13.00	12.50	24.50
Ref'd, c-l, NY ...... ton	13.00	18.00	13.00	18.00	17.25	19.25
Tin, crystals, bbls, wks .. lb.	.39	.39½	.39	.39½	.39	.39½
Metal, NY (*PC*) (A) .. lb.	...	.52	...	.52	...	.52
Titanium Dioxide (*PC*) .. lb.	.15	.15¾	.15	.15¾	...	.14½
Toluol, drs, wks (*FP*) (A) gal.	...	.33	...	.33	...	.33
tks, frt all'd (*FP*) .... gal.	...	.29½	...	.29½	...	.28
Tributyl Phosphate, dms lcl,						
frt all'd .... lb.	...	.47	...	.47	...	.47
Trichlorethylene, dms, wks lb.	(*FP*)	.09	(*FP*)	.09	...	.08
Tricresyl phosphate (*FP*) lb.	.24	.54½	.24	.54½	.25	.31
Triethylene glycol, dms lcl lb.	...	.26	...	.26	...	.26
Trimethyl Phosphate, drs lb.	.54	.56	.54	.56	.54	.56
Triphenyl Phos, drs (*FP*) lb.	.31	.32	.31	.32	.31	.32
Urea, pure, cases .... lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs ..... lb.	.25	.26	.18	.20	.18	.20
Bees, bleached, cases .. lb.	.60	.63	.60	.63	.58	.61
Candelilla, bgs .... lb.	.38	.48	.38	.48	.33	.38
Carnauba, No. 1, yellow,						
bgs. .... lb.	.83¼	.93¼	.83¼	.93¼	.83¼	.89
Xylol, frt all'd, tks, wks .. gal.	...	.27	...	.27	...	.27
Zinc Chloride fused, wks .. lb.	.05	.0535	.05	.0535	...	.05
Metal, high grade slabs, c-l,						
NY (*FP*) (*PC*) 1000 lb.	...	8.66	...	8.66	...	8.65
Oxide, Amer, bgs, wks lb.	.07¼	.07½	.07¼	.07½	...	.07¼
Sulfate, crys, bgs, .. 100 lb.	3.60	4.35	3.60	4.35	3.60	3.65

Oils and Fats

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Babassu, tks, futures .... lb.	...	.111	...	.111	no prices	
Castor, No. 3, bbls ...... lb.	.13¾	.14¼	.13¾	.14¼	.12½	.13¾
China Wood, drs, spot NY lb.	...	.39	...	.39	.39	.40⅜
Coconut, edible, drs NY .. lb.	...	.0985	...	.0985	...	...
Cod Newfoundland, dms .. gal.	...	.90	...	.90	.85	.90
Corn, crude, tks, mills ... lb.	...	.12¾	.12¾	nom.	.12½	.12¾
Greases, Yellow .... lb.	...	.0929	...	.0929	...	.0929
Linseed, Raw, dms, c-l, spot lb.	.1560	.1640	.1560	.1640	.117	.143
Menhaden, tks, Baltimore gal.	...	.088	...	.089	.63¾	.666
Light pressed, drs ..... lb.	.117	.119	.117	.119	.11	.139
Oiticica, dms .... lb.	.23	.25	.23	.25	.29	.25
Oleo, No. 1, bbls, NY ... lb.	.13¾	nom.	nom.	.13¼	...	.13¼
Palm, Niger kernel, cks						
bulk .... lb.	...	.0825	...	.0825	.0925	...
Peanut, crude, tks, f.o.b. mill lb.	...	.13	...	.13	.12⅞	.13
Perilla, crude dms, NY (A) lb.	...	.245	...	.246	...	.246
Rapeseed, denat, bulk ..... lb.	...	.1150	...	.1150	...	...
Red, dms .... lb.	.13¼	.14¼	.13¼	.14¼	.11¾	.143
Soy Bean, crude, tks, mill lb.	...	.1175	.12¼	nom.	.12¼	nom.
Stearic Acid, double pressed						
dist bgs .... lb.	.14½	.15½	.14	.15¾	.14	.16½
Tallow, acidless, bbls ..... lb.	...	.14¼	...	.14¼	...	...
Turkey Red, single, drs .. lb.	.10	.13½	.10	.13½	...	.08¾

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b N. Y., refined 6c higher in each case.

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Index to Advertisers

PROFESSIONAL DIRECTORY

"WE"- EDITORIALLY SPEAKING

Not so long ago soap people, fearing a phthalic anhydride bottleneck in an otherwise promising alkyd resins picture, were letting down their hair on glycerine outlook in an effort to get phthalic producers to do the same, thus permitting some approximation of upper limits on requirements of glycerine for alkyds. Or at least that was the idea. Funny how unpredictable those little rascals, supply and demand, can be sometimes, especially in wartime.

Probably one of the important developments that will come out of the present war is the industrial awakening of China.

The U. S. has always had good relations with that country and much good has been done there by Americans, especially in education. However in the past several years there has been a much closer association of industry and technology with China.

The Chinese nation and people have earned a high place in the estimation of Americans. Thus it was with great interest that we recently read an announcement by the Board of Economic Warfare that thirty-two Chinese engineers in their twenties and early thirties, who hope some day to rebuild industrial China, have arrived in the U. S. and are studying American engineering techniques.

Under a program developed jointly by the BEW and the National Resources Commission of China, the young engineers will work here two years in various fields. Several of them have been assigned to the Tennessee Valley Authority and the others are with American industrial firms studying mechanical and chemical engineering, metallurgy, mining, petroleum and industrial management.

Those assigned to the chemical field are L. C. Hui, nitrogen products, T.V.A.; S. T. Yeh, chemical machinery, Buffalo Foundry & Machine Co.; C. Hsuan, coke ovens, Koppers Co. and S. Y. Hsiung, petroleum refining, Standard Oil Co. of N. J.

W. L. Semon of Goodrich said at the Detroit A. C. S. Meeting that rubber from corn alcohol will always be expensive. Why not just say corn alcohol will always be expensive and be done with it?

Pre-requisite for men being put through Army and Navy refresher courses in engineering is supposed to be some amount of prior training in engineering at college level. We understand one old dog who had a semester at Purdue back in 1923 is finding the going a little tough.

Of course it won't help the glycerine situation any, but fats and oils users feel that it would at least make life a little easier if fats and oils and their non-edible as well as edible end-products were back under one government agency again instead of split between the Department of Agriculture and WPB.

Fifteen Years Ago

From Our Files of May, 1928

American Chemical Society at its Seventy-Fifth meeting in St. Louis announces gifts aggregating $360,000 for "cooperative service in recording and indexing through the society's publications the chemical literature of the world." The Chemical Foundation, Inc., gave $250,000. The remaining $11,000 came from industry.

Announcement is made of the formation of American Commercial Alcohol Corp., which has acquired the assets of American Distilling Co., David Berg Industrial Alcohol Co., Inc., and S. M. Mayer Alcohol Co., Inc., with plants located, respectively, at Pekin, Ill., Philadelphia and New Orleans.

American Potash Co., Dallas, Texas, is chartered with capital of 10,000,000 shares of no-par stock, to engage in the mining and refining of potash.

J. T. Baker Chemical Co. purchases the Dissisway Chemical Co.

J. W. Block, organizer in 1902 of the Superior Chemical Co., Joliet, Ill., establishes the Blockson Chemical Co., capitalized at $300,000, in that city to engage in manufacture of chemicals.

Dr. Edgar Fahs Smith, provost of the University of Pennsylvania from 1911 to 1920, professor emeritus of chemistry of that university and a chemist of international repute, died on May 3.

There is something phony about a statistic that colds cause more absenteeism than strikes. You don't declare a cold, or vote it as a policy.

In these days of war, when the devil surely takes the hindmost, we find ourselves admiring more and more Charles F. Kettering's well known saying, "I prefer unintelligent action to intelligent doing nothing."

We have noticed during the past few months that there has been a definite slackening in a favorite bureaucratic pastime of scolding industry and business. The proof of industry's ability and desire to consider the war first is being reflected in the turning of the tide of battle with more and better supplies and weapons.

A recent report of the Rockefeller Foundation which has encouraged fundamental scientific research for many years shows that war definitely interrupts long range programs for the advancement of knowledge and culture. According to the report, there was a cut of $1,000,000 in the appropriation for 1942 compared to 1941, so that naturally work in the basic natural sciences was of necessity curtailed.

Of course, it is necessary that we forego many things in time of war but it is with a definite feeling of regret that a gap is allowed to appear in the unfolding of nature's secrets.

We recently ran across the following idea in customer relations which struck us as being quite constructive. To help relieve the problem of keeping track of all the government restrictions and regulations regarding materials, The Baker Castor Oil Co. now sends to its customers reprints of orders, priority forms, etc., which concern its products.

A Complete Check—List of Products, Chemicals, Process Industries

Agricultural and Food Chemicals

Heavy, dense, manure-like humous material in the form of a paste. No. 2,313,434. Ernest Grether to The Dow Chemical Co.
Process for retting coconut fibres. No. 2,313,297. Bernard Maisant.
Making iron phytate, by extracting corn with water to produce steep water containing a water-soluble phytin derivative. No. 2,313,276. Herman Schopmeyer and Gordon Sharps to American Maize-Products Co.
Manufacture of phosphate fertilizer from phosphate rock and sulfuric acid. No. 2,312,048. Walter P. Swarthmore to The Penna. Salt Mfg. Co.
Purifying fish and fish liver oils. No. 2,311,633. James G. Blaso to Natural Vitamins Corp.
Salad dressing comprising carob gum and edible organic acid. No. 2,313,033. Morris Joffe to Emulsol Corp.
Producing stable, granular casein product by mixing moist, freshly formed casein curd containing not over 70% moisture with dry powdered sodium fluoride. No. 2,312,467. Francis Atwood to Atlantic Research Associates, Inc.
Zein film containing the following substances in proportions by weight as follows: zein 100 parts, sorbitol 5-20 parts, triethanolamine 20-50 parts No. 2,311,485. Oswald Sturken to Corn Products Refining Co.
Maltose and galactose fermentations. No. 2,311,318. Alfred S. Schultz, Lawrence Atkins and Charles N. Frey to Standard Brands Inc.
Milk product and manufacture thereof and composition therefor. No. 2,311,343. Victor C. E. Le Gloahee to Algin Corp. of America.

Cellulose

Dressed and softened regenerated cellulose products. No. 2,312,708. Walter Gellendien and Johann Eggert to Patchem A.-G. Zur Beteiligung an Patenten und Sonstigen Erfindungsrechten auf Chemische Verfahren.
Process for the manufacture of shaped structures from solutions of cellulose derivatives. No. 2,310,969. Leon Lilienfeld to Lilienfeld Patents Inc.

Ceramics

Obtaining substantially colorless high barium crown glasses. No. 2,313,685. Harry Truby to Pittsburgh Plate Glass Co.
Transfer medium for decorating vitreous objects comprising thin self-sustaining plastic film. No. 2,311,786. Henry F. Scheetz, Jr. to Fuller Label & Box Co.
Homogeneous enamel flux for glass melting around 1100° F. having resistance to acids. No. 2,312,788. Ray Andrews and Robert King to B. F. Drakenfeld & Co., Inc.
Bauxite ceramic and method of making same. No. 2,311,228. John A. Heany to Heany Industrial Ceramic Corp.
Ceramic from bauxite and process of making same. No. 2,310,953. John Heany to Heany Industrial Ceramic Corp.

Chemical Specialty

Wetting, cleansing, dispersing and emulsifying composition. No. 2,313,631. Herman Bruson Rohm & Haas Co.
Parasiticide composition and method of producing the same. No. 2,313,588. Frank Seibert and Louis Roller to Chipman Chemical Co. Inc.
Parasiticide composition and method of producing the same. No. 2,313,589. Frank Seibert and Louis Roller to Chipman Chemical Co. Inc.
Glass cleaning composition for cleaning of automobile windshields. No. 2,313,425. Marcellus Flaxman to Union Oil Company of California.
Printing ink. No. 2,313,328. Donald Erickson and Paul Thoma to Michigan Research Laboratories, Inc.
Lubricant comprising oil of lubricating viscosity and a chlorine bearing relatively pure, sulfurized olefin. No. 2,313,248. Bert Lincoln, Waldo Steiner and Gordon Byrkit to The Lubri-Zol Development Corp.
Preparation and use of anti-crytogamic colloidal solutions, bactericides, and insecticides. No. 2,313,190. Paul Bary.
Adhesive composition for bonding a hard fibrous material to a base. No. 2,313,114. Benjamin Adams to Armstrong Cork Co.
Investment composition for casting metals and their alloys. No. 2,313,086. Robert Neiman, Robert Ernst, and Edmund Steinbock to University of Louisville.
Investment composition for casting metals and their alloys, consisting principally of a refractory filler and a binder. No. 2,313,085. Robert Neiman, Robert Ernst and Edmund Steinbock to University of Louisville.
Combination of a self-sustaining shell of colloidal material, a seed embedded therein and plurality of different substances for facilitating the growth of the seed when planted. No. 2,313,057. Albert Fischer.
Glue suitable for use in making plywood containing a seedmeal of high protein content. No. 2,312,056. Donald J. White to The Borden Co.
Lubricating Composition. No. 2,311,931. Elmer W. Cook and William D. Thomas, Jr. to American Cyanamid Co.
Cough drop or like edible article comprising edible and medicated hard candy shell and medicated liquid center. No. 2,311,923. Alfred J. Lautmann to Iodent Chemical Co.
Anti-seize paste for sealing threaded joints and like parts between metals. No. 2,311,772. Arthur L. Parker.
Preformed spray composition suitable for making insecticidal aqueous spray. No. 2,311,629. Robert B. Arnold to Tobacco By-Products and Chemical Corp.
Moth-proofing composition, containing a quaternary cyclic monoamidine of the benzene series. No. 2,312,923. Henry Martin and Curt Glatthaar and Alfred Staub to J. R. Geigy A. G.
Insecticidal composition in which active principle is a methallyl ether of nitro-substituted phenols. No. 2,312,801. W. Craig and William Hester to Rohm & Haas Co.
Lime soap grease comprising a major proportion of mineral oil base stock and a minor proportion of lime soap. No. 2,312,725. Arnold Morway and John Zimmer to Standard Oil Development Co.
Burn remedy comprising emulsion of polyisobutylene and a solution of tanning agent. No. 2,312,715. Robert Holmes and Hugh De Hoff to Stanco, Inc.
Medicinal tablet including a medicinal central thin portion. No. 2,312,381. Frank Bickenheuser.
Extreme pressure lubricant. No. 2,311,500. John Zimmer and George McNulty to Standard Oil Development Co.
Fungicidal and insecticidal preparation containing as an active essential ingredient a salt of an N-aryl hydroxylamine with an acid. No. 2,311,585. William ter Horst to United States Rubber Co.
Wax composition. No. 2,311,338. John B. Holtzclaw and John E. Clemens to Standard Oil Development Co.
Method producing lubricating material. No. 2,311,305. Harold W. Ritchey to Union Oil Co. of California.
Water dispersed adhesive composition and articles comprising same. No. 2,311,301. Harvey J. Livermore to Minnesota Mining & Mfg. Co.
Adhesives. Nos. 2,311,271 and 2,311,272. Willis C. Ware to Industrial Abrasives, Inc.
Crystalline sweetening substance comprising sorbitol, mannitol and dulcin. No. 2,311,235. Joseph Kuderman.
Lubricant. No. 2,310,993. Carl Prutton to The Lubri-Zol Development Corp.
Stabilized high film strength lubricating oil. No. 2,310,971. Bert Lincoln and Waldo Steiner to The Lubri-Zol Development Corp.
Lethal composition for insects. No. 2,310,949. Jared Ford and Howard Eck to Kilgore Development Corp.

Coatings

Coating composition. No. 2,312,088. Cornelius S. Fleming.
Coating composition containing shellac and melamine-formaldehyde resin. No. 2,311,911. Robert C. Swain and Pierrepont Adams to American Cyanamid Co.
Production of coating composition adapted to moistureproof regenerated cellulose sheet. No. 2,311,831. George S. Heaven and William Berry to E. I. du Pont de Nemours & Co.
Obtaining a corrosion-resistant, paint-holding coating on aluminum or an alloy. No. 2,312,855. John Thompson to Parker Rust Proof Co.
Method of applying luminescent coating. No. 2,311,513. Maurice Bell and Leo Berberich to Westinghouse Electric & Mfg. Co.
Hot-melt coating composition. No. 2,311,609. Toivo Kauppi and Myron Kin to The Dow Chemical Co.

Dyes, Stains

Chrome Yellow. No. 2,313,619. Harry Bruce.
Water-soluble azo dyes from aminoaryloxy-acyl-diamines. No. 22,287. Chiles Sparks and James Libby, Jr. to E. I. du Pont de Nemours & Co.
Azo dyes. No. 22,286. Swanie Rossander, Donovan Kvalnes and Chiles Sparks to E. I. du Pont de Nemours & Co.
Olive to grey dyestuffs of the anthraquinone series. No. 2,312,462. Alexander Wuertz and Donald Graham to E. I. du Pont de Nemours & Co.
Olive dyestuffs of the anthraquinone series. No. 2,312,401. Donald Graham to E. I. du Pont de Nemours & Co., Inc.
Dyestuffs preparations containing two dyestuffs dyeing blue shades. No. 2,312,398. Friedrich Felix to Society of Chemical Industry.

Equipment

Apparatus for extracting petroleum products from natural gas by retrograde condensation. No. 2,313,681. Edwin Steedman.
Distillation Apparatus. No. 2,313,546. Kenneth Hickman Distillation Products, Inc.
Frame for dialyzing apparatus. No. 2,312,015. George H. Weber to Brosites Machine Co., Inc.
Continuous rotary heat exchanger for catalyst systems. No. 2,311,984. Wilbur G. Cuild to Standard Oil Co. (Corp. of Indiana).
Ion activity measurement device. No. 2,311,977. Edwin D. Coleman.
pH measurement and control device. No. 2,311,976. Edwin D. Coleman.
Apparatus for reducing iron ore concentrates to pure sponge. No. 2,311,962. Clarence Q. Payne.
Oxygen supply apparatus comprising two cylinders. No. 2,311,955. Herman Merker to Pressed Steel Tank Co.
Heating oven particularly for hardening glass plates. No. 2,311,908. Felix Vranken, to Alien Property Custodian.
Apparatus for controlling flow of fluid which increases in volume when subjected to a pressure drop. No. 2,311,868. Roy M. Rhoades ¼ to Arthur L. Armentrout, ¼ to Elwin B. Hall and ¼ to Virgil P. Baker.
Mercuric Ore reduction furnace. No. 2,311,648. Frank Duncan.
Apparatus for recovering carbon bisulfide and sulfurated hydrogen during the finishing process of the manufacture of viscose staple fiber. No. 2,313,006. Waclaw Ufnowski.
Filter for separating solids from a fluid. No. 2,312,999. Lambertus de Langen.
Solvent recovery apparatus for recovery of chlorinated hydrocarbons. No. 2,312,910. Harley Jennings to Copeman Laboratories Co.
Method of separating granular materials. No. 2,312,865. Byron Bird and Frank Smith to Battelle Memorial Institute.
Method and apparatus for separating liquids from solids. No. 2,312,829. Byron Bird and Frank Smith to Battelle Memorial Institute.
Apparatus for the distillation and condensation of metals. No. 2,312,811. Henri Gentil to Alloy Processes Ltd.
Apparatus for treating plastic material. No. 2,312,639. Fred Gronemeyer to Monsanto Chemical Co.
Double cone blender, for rapid mixing of dry powders with a tendency to agglomerate in mixing process. No. 413,113. K. K. Porter Company, Inc.

Liquid treatment apparatus. No. 2,311,532. Victor Gershon.
Apparatus for concentration of minerals and like materials. No. 2,311,414. Frank C. Peterson.
Piston ring having thin coating of iron and zinc phosphate and iron oxide. No. 2,311,240. Charles A. Marien and Melvin W. Marien to Ramsey Accessories Mfg. Corp.
Rotameter construction. No. 2,311,181. Kenneth D. Bowen to The Dow Chemical Co.
Apparatus for hydrocarbon alkylation. No. 2,311,144. Henry P. Wickham and Myrle M. Perkins to The M. W. Kellogg Co.
Means for indicating liquid levels. No. 2,310,999. Julius Schierenbeck.
Coke oven apparatus. No. 2,310,924. Joseph Becker to Koppers Co.

Fine Chemicals

Production of color film having a silver sound track. No. 2,313,632. John Eggert, Leipzig and Hans Friedrich to General Aniline & Film Corp.
Hydroxynaphthoic acid amide coupler color forming photographic developer. No. 2,313,586. Ilmari Salminen, Arnold Weissberger, and Dudley Glass, to Eastman Kodak Co.
Gelatino-silver halide emulsion containing as an antifoggant a diacetylamino phenol. No. 2,313,529. George Fallesen and John Leermakers. Eastman Kodak Co.
Photographic agent which will affect a photographic image and a compound of an aldehyde with a bisulfite. No. 2,313,523. Thomas S. Donovan, Walter Wadman. Eastman Kodak Co.
Cyanoacetly Coupler, Color forming Photographic developer. No. 2,313,498. Charles Allen and Paul Vittum to Eastman Kodak Co.
Chloranthraquinones and a process of making them. No. 2,313,155. Paul Kranzlein to General Aniline & Film Corp.
Producing color photographic images by color forming development, by developing an exposed silver halide gelatine emulsion with an aromatic primary amino developer in the presence of a hydroxy-aza-phenanthrene as a dyestuff former. No. 2,313,138. Alfred Frohlich and Wilhelm Schneider to General Aniline & Film Corp.
Sensitizing of silver halide emulsions. No. 2,312,153. Walter Dieterle to General Aniline & Film Corp.
Process for sensitizing photographic emulsions. No. 2,312,068. Fritz Bauer and Gustav Wilmann to General Aniline & Film Corp.
Photographic color forming developer comprising aromatic amino developing compound containing unsubstituted amino group and a color former. No. 2,312,040. John D. Kendall and Ronald B. Colling to Ilford Ltd.
Producing 2-(p-aminobenzene sulfonamido-) pyridine. No. 2,312,032. Arthur J. Ewins and Montague A. Phillips to May & Baker, Ltd.
Production of a color photographic silver halide emulsion containing a sensitizer and a dyestuff former fast to diffusion. No. 2,312,004. Wilhelm Schneider and Alfred Frohlich to General Aniline & Film Corp.
Halogenated compounds containing a sterol nucleus. No. 2,311,638. Adolf Butenandt, to Schering Corp.
Manufacture of lactams by Beckmann rearrangement of cyclid ketoximes. No. 2,313,026. Paul Schlack.
Preparing gonadotropic pituitary hormones. No. 2,312,901. Max Hartmann, Reichen, and Fritz Benz to Ciba Pharmaceutical Products, Inc.
Producing a colored photographic image from an initial silver black-and-white image developed in the gelatin. No. 2,312,875. Albert Bunting and Raymond Thomas to Union Research Corp.
Converting a developed photographic silver print to a blue color print. No. 2,312,874. Albert Benting to Union Research Corp.
Light-sensitive product which comprises a layer of a hydrophilic polyvinyl alcohol having superimposed a chromic salt dispersed in a colloid, said polyvinyl alcohol being effective to prolong the period of light sensitivity of said chromic salt. No. 2,312,854. William Toland and Ellis Bassist to William Craig Toland.
Light-sensitive element comprising a support presenting thereon a film of hydrophilic polyvinyl alcohol, a water-soluble colloid layer disposed over said film, said colloid having a silver halide light-sensitive salt. No. 2,312,852. William Toland and Ellis Bassist to William Craig Toland.
Obtaining crystallized digitalis glucosides and strophanthus glucosides. No. 2,312,588. Erich Rabald and Josef Kraus to Rare Chemicals, Inc.
Light-sensitive material comprising three silver halide emulsion layers. No. 2,312,543. Paul Goldfinger to Chromogen, Inc.
Manufacture of ketols of the saturates and unsaturated cyclopentanopolyhydrophenanthrene series. No. 2,312,484. Tadeus Reichstein to Roche-Organon, Inc.
A cyclopentano-dimethyl-polyhydro-phenanthrene compound. No. 2,312,483. Tadeus Reichstein to Roche-Organon, Inc.
Oxidizing compounds of cyclopentano-dimethyl-polyhydro-phenanthrene series. No. 2,312,482. Tadeus Reichstein to Roche-Organon, Inc.
New compound pregnene-4-dione-3,20-ol-21. No. 2,312,481. Tadeus Reichstein to Roche-Organon, Inc.
Derivatives of pregnane and pregnene. No. 2,312,480. Tadeus Reichstein to Roche-Organon, Inc.
Producing water-soluble anaesthetic compounds. No. 2,312,440. Jean Regnier.
Manufacture of polyhydric alcohols of the cyclopentano polyhydro phenanthrene series. No. 2,312,344. Willy Logemann to Schering Corp.
Process of incorporating vitamins A and D into aqueous mediums. No. 2,311,517. Loran Buxton and Sol Lipsium to National Oil Products Co.
Water-dispersible fat-soluble vitamin composition and process of preparing the same. No. 2,311,554. Sol Lipsium to National Oil Products Co.
Preparing photographic images, developing image in presence of piperazine, glycine, paraphenylene, diamine, sodium sulfite and potassium bromide. No. 2,311,428. Wm. H. Wood to Harris-Seybold-Potter Co.
Photographic silver halide emulsion. No. 2,311,103. Walter J. Weyerts to Eastman Kodak Co.
Photographic film comprising nitrocellulose film base stabilized by a dihydrazide of an aliphatic dicarboxylic acid. No. 2,311,098. Donald R. Swan and John M. Calhoun to Eastman Kodak Co.
Rearrangement of iso-dialkylstilbestrols to dialkylstilbestrols. No. 2,311,093. Arthur Serini and Konrad Steinruck to Schering Corp.
Method preparing photographic products from compositions containing far-hydrolyzed cellulose esters. No. 2,311,086. Martin Salo to Eastman Kodak Co.
Pyrazolone coupler for color photography. No. 2,311,082. Henry D. Porter and Arnold Weissberger to Eastman Kodak Co.
Iminopyrazolone coupler for color photography. No. 2,311,081. Henry D. Porter and Arnold Weissberger to Eastman Kodak Co.
Antihalation film. No. 2,311,073. Gale F. Nadeau and Alfred D. Slack to Eastman Kodak Co.
Saturated and unsaturated 17-hydroxy-androstanes their derivatives and substitution products and process of making same No. 2,311,067. Karl Miescher and Albert Wettstein to Ciba Pharmaceutical Prods. Inc.
Amino anthraquinones. No. 2,311,065. James G. McNally and Joseph B. Dickey to Eastman Kodak Co.
Photographic silver halide emulsion. No. 2,311,059. Wesley Lowe to Eastman Kodak Co.
Photographic silver halide emulsion. No. 2,311,058. Wesley Lowe to Eastman Kodak Co.
Iodo derivatives of steroid compounds and a process of manufacturing the same. No. 2,311,050. Burckhardt Helferich and Erich Gunther to Schering Corp.
Azo compounds and material colored therewith. No. 2,311,033. Joseph Dickey to Eastman Kodak Co.
8-amino-5-hydroxy-2-sulfoethyl-amino 1,4-naphthoquinone. No. 2,311,032. Joseph Dickey and James McNally to Eastman Kodak Co.
Method of dispersing coloring materials in water swellable colloids. No. 2,311,020. David Bennett, Jr. and Scheuring Fierke to Eastman Kodak Co.
Photographic material and method of producing same. No. 2,311,016. Roelof Alink. Jan de Boer and Cornelis Veenemans to Hartford National Bank and Trust Co.
Method of producing dye images. No. 2,311,015. Richard Young and George Ehrenfried to Eastman Kodak Co.
Photographic reversal process of producing dye images without re-exposure. No. 2,310,982. Emery Meschter to E. I. du Pont de Nemours & Co.
Reducing bath for color photography and process of using the same. No. 2,310,980. Emery Meschter to E. I. du Pont de Nemours & Co.
Dialkylamino-alkyl beta-alkyl-cinnamate hydrochlorides. No. 2,310,973. William Lott to E. R. Squibb & Sons.
Pain-alleviating material. No. 2,310,937. Hendry Connell to Canadian-American Pharmaceutical Co.

Industrial Chemicals

Sand-mold-forming composition for use in the preparation of molds for sand castings. No. 2,313,697. John Juppenlatz to Treadwell Engineering Co.
Preparing amino-sulfonic acids substituted in the amino group by acyl radicals of fatty acids. No. 2,313,695. Shun-ichi Yamashita and Tokuzo Yoshizaki to General Aniline & Film Corp.
Process of continuous counter-current hydrolysis of fat wherein a body of fat flows upwardly in a column against a downwardly flowing rain of water. No. 2,313,692. Baruch Winer.
Making alkali metal thiocyanate. No. 2,313,680. Lee Smith to General Chemical Co.
Heating impure sulfuric acid containing organic froth promoting constituents as a froth minimizer, a small amount of material of the group consisting of saturated fatty acids, their esters and salts. No. 2,313,677. John Shinn to General Chemical Co.
Foundry sand mold. No. 2,313,674. Harold Salzbert and Walter Kinney to The Borden Co.
Foundry sand mold surface. No. 2,313,672. Harold K. Salzberg and Walter Kinney to The Borden Co.
Separating mixtures of saturated and unsaturated fatty acids into a plurality of fractions, one of which is relatively rich in, and the other of which is relatively poor in unsaturates. No. 2,313,636. Stephen E. Freeman, to Pittsburgh Plate Glass.
Making crystalloidal liquid titanium salt solution, of predetermined acidity factor. No. 2,313,615. L'Roche Bousquet and David Young to General Chemical Co.
Sulfurizing organic substances. No. 2,313,611. William Abramowitz, Ralph Beach to National Oil Products Co.
Treatment for n-monomethyl-p-aminophenol, preparing n-monomethyl-p-aminophenol. No. 2,313,605. Thomas Elliott Wannamaker to Eastman Kodak Co.
Preparing a safety paper which comprises incorporating in paper a benzidine compound. No. 2,313,592. Burgess Smith, to The Todd Co. Inc.
Capillary active compounds and process of preparing them. No. 2,313,573. Ludwig Orthner, Carl Platz and Hans Keller to General Aniline & Film Corp.
Recovery of Benzene from a benzene fraction containing the same. No. 2,313,538. Richard Greenburg to Allied Chemical & Dye Corp.
Recovery of Xylene from oils containing the same. No. 2,313,537. Richard Greenburg to Allied Chemical & Dye Corp.
Recovery of benzene fractions with butyraldehyde. No. 2,313,536. Richard Greenburg to Allied Chemical & Dye Corp.
Minimizing sludge formation in oils used scrubbing gases using phenolic ether. No. 2,313,531. Louis Figg, Jr. and Edward Shaulis to Eastman Kodak Co.
Sulfydryl compound obtained from flour. No. 2,313,504. Arnold Balls and Walter Hale.
Preparing methylene dialkyl malonates. No. 2,313,501. Bryant Bachman and Howard Tanner to Eastman Kodak Co.
Nitrating finely divided lignocellulosic material containing a substantial proportion of lignin. No. 2,313,441. Edwin Jahn and Sydney Coppick.
Electrolytic production of sodium and potassium. No. 2,313,408. Raymond Vingee and Charles Lawrence to The Solvay Process Co.
Maleic anhydride-tar base condensation product and process for its production. No. 2,313,392. Stuart Miller to Allied Chemical & Dye Corp.
Concentration and extraction of acetic acid in aqueous solutions. No. 2,313,386. Jean Levesque.

Extraction of oils from hardwood tar and purification thereof. No. 2,313,385. Jean Levesque to The Province of Quebec.
Directly obtaining positive images of a positive drawing on a translucent sheet. No. 2,313,288. Emilien Barde.
Cracking an oil material. No. 2,313,241. Alfred Jessup to Charles Weizmann.
Polymerizing a monomeric mixture containing a butadiene compound and at least one other unsaturated compound. No. 2,313,233. Charles Fryling to The B. F. Goodrich Co.
Recovery of alcohols from olefin hydration products. No. 2,313,196. Henri Guinot.
Removal of silica from water. No. 2,313,194. Sebastien Fiedler and Geza Austerweil.
Dehydrogenating aliphatic. No. 2,313,162. Jacque Morrell and Aristid Grosse to Universal Oil Products Co.
Production of aqueous dispersions of ethylene polymer. No. 2,313,144. Albert Gomm to Imperial Chemical Industries Ltd.
Hectograph blanket comprising a copy mass of a tanned gelatin gel. No. 2,313,124. William Champion to Ditto, Inc.
Slurry for filling the fine voids and interstices of porous masses of earth, rock masonry, concrete. No. 2,313,107. Louis Wertz.
Coloring a cellulose derivative selected from the group consisting of water-insoluble esters and ethers of cellulose. No. 2,313,076. Gustave Klinkenstein, Frederic Dannerth and Conrad Frey to Maas & Waldstein Co.
Preparation of improved aluminum chloride catalysts. No. 2,313,053. Martin de Simo and Frank McMillan and Harry Cheney to Shell Development Co.
Preparing a liquid adhesive by dissolving unplasticized neoprene in toluol. No. 2,313,039. Roland Earle to Union-Baystate Co., Inc.
Process of sterilizing normally dry material. No. 22,284. Carroll Griffith and Lloyd Hall to The Griffith Laboratories, Inc.
Production of acetic acid ester of a cyclic ketal. No. 2,312,298. Kenneth E. Marple to Shell Development Co.
Luminescent material comprising strontium tungstate containing excess of strontium in form of strontium sulfate. No. 2,312,268. Willard A. Roberts to General Electric Company.
Fluorescent material comprising tungstate of a base metal containing an excess of metal in the form of a sulfate of metal. No. 2,312,267. Willard A. Roberts to General Electric Company.
Producing fluorescent aluminum oxide. No. 2,312,266. Willard A. Roberts to General Electric Co.
Fluorescent material. No. 2,312,265. Willard A. Roberts to General Electric Co.
Coating the interior surface of vitreous lamp envelope with powdered fluorescent material. No. 2,312,229. James T. Anderson to General Electric Co.
Adding chloramines to water after leaving cooling system to maintain such water substantially free of algae and thereby decrease amount of oil carried to waste. No. 2,312,221. Charles J. Sprigman and Shepard T. Powell to Socony-Vacuum Oil Co.
Stable dry mixture comprising hardenable water-soluble formaldehyde-urea reaction product, ammonium sulfate and chloride of alkaline earth metal. No. 2,312,214. Arthur M. Howald and William C. Dearing.
Stable formaldehyde-urea composition containing a hardening agent. No. 2,312,210. William C. Dearing.
Coagulant consisting of two aluminum atoms, one sulfate group, two chlorine atoms and two hydroxyl groups. No. 2,312,198. Edgar A. Slagle to Research Corp.
Manufacturing alcohol from peat. No. 2,312,196. Antonie St.-Leger.
Salts of dextro-ascorbic acid. No. 2,312,195. Simon L. Ruskin.
Preparing alkylidene derivatives of alpha-methylene monocarboxylic acids. No. 2,312,193. Henry J. Eichter to E. I. du Pont de Nemours & Co.
Producing nitrogenous ethers. No. 2,312,135. Heinrich Ulrich and Karlhugo Kuespert to General Aniline & Film Corp.
Forming protective film. No. 2,312,076. Willard O. Cook and Hugh E. Romine to Carnegie-Illinois Steel Corp.
Production of dihalogenated saturated hydrocarbon. No. 2,312,064. Hans Baehr and Wilhelm Deiters to General Aniline & Film Corp.
Fluorine removal from phosphate liquors. Sihon C. Ogburn to General Chemical Co.
Production of dry alkali metal phenolates. No. 2,312,001. Theodor Sabalitschka to Heyden Chem. Corp.
Separating powdered catalyst from regeneration gas. No. 2,311,978. Arthur L. Conn to Standard Oil Co. (Corp. of Indiana).
Refractory body comprising iron free chromite spinel in a ground mass of magnesium orthosilicate, with magnesio-ferrite, periclase and monticellite dispersed in the ground mass. No. 2,311,970. Gilbert E. Seil to E. J. Lavino and Co.
Desulfured and regenerated cellulosic sheet wrapping material softened with material. No. 2,311,910. William D. R. Straughn to E. I. du Pont de Nemours & Co.
Aromatic acyloxy aliphatic nitriles. No. 2,311,898. Joy G. Lichty to Wingfoot Corp.
Production of tocopheryllike compounds. No. 2,311,887. Max Tishier and Clarence C. Christman to Merck & Co.
Preparation of nitrourea. No. 2,311,784. Charles P. Spaeth to E. I. du Pont de Nemours & Co.
Converting ring halogenated carbocyclic compound to corresponding hydroxy compound. No. 2,311,777. Lawrence V. Redman to Bakelite Corp.
Symmetrical adipic-di-(amino-N-substituted anilide). No. 2,311,754. George F. Howard and Arthur Howard Knight to Imperial Chemical Industries Ltd.
Symmetrical adipic di-(amino-N-substituted-anilide). No. 2,311.753. George F. Howard and Arthur H. Knight to Imperial Chemical Industries, Ltd.
Mercury amalgam decomposition cell. No. 2,311,745. William C. Gardner and Joseph L. Wood to The Mathieson Alkali Works Inc.

Mercury amalgam decomposition cell. No. 2,311,744. William C. Gardiner to The Mathieson Alkali Works, Inc.

Water purification by adding sodium silicate and a metal salt to warm water prior to the addition of the coagulant. No. 2,310,009. Chester L. Baker and Charles H. Dedrick to Philadelphia Quartz Co.

Production of aliphatic polyhydroxy compounds. No. 2,311,741. Henry Dreyfus to Celanese Corp. of America.

Improved combination aluminum chloride catalyst. No. 2,311,713. Samuel B. Thomas and Frank M. McMillan to Shell Development Co.

Production of improved combination aluminum chloride catalysts. No. 2,311,712. Samuel Benson Thomas, to Shell Development Co.

Producing improved drying oil. No. 2,311,681. Richard S. Morse to Distillation Products, Inc.

Chemical treatment of frictional surfaces to facilitate wearing-in. No. 2,311,653. Bruce B. Farrington, Robert L. Humphreys, and Ronald T. Macdonald to Standard Oil Co. of Calif. (Corp. of Del.)

Corrosion inhibitor. No. 2,311,644. Ernest R. Darby and Philip J. Potter to Federal-Mogul Corp.

Making ethylene cyanohydrin. No. 2,311,636. Edgar C. Britton, Howard S. Nutting, Myron E. Huscher, and Arthur R. Sexton to The Dow Chemical Co.

Forming smoke consisting in subjecting cyclohexylamine to action of carbon tetrachloride and acetone. No. 2,311,635. Herbert E. Britt.

Removing sulfuric acid mist and sulfur oxides, from gaseous mixture. No. 2,311,625. David W. Bransky and Fred F. Diwoky to Standard Oil Co. (Corp. of Indiana).

Production of sodium and potassium hydride. No. 2,313,028. Friedrich Siegmann.

Protecting live epidermis or skin from injurious effects due to the dye of the socalled oxidation type used in hair dyeing. No. 2,313,027. Eugene Schueller.

Purification of hydrocarbon gas containing hydrogen phosphide. No. 2,313,022. Friedrich Rottmayr.

Alkamine esters. No. 2,313,016. Schmul Horenstein and Hermann Pahlicke.

Separating plurality of substances capable of forming foams of different rigidities. No. 2,313,007. Marcel Abribat.

Hardening fibrous protein material with methanal. No. 2,312,998. George de Kadt.

Reducing ketone group to an amino group, and producing 12-aminostearic acid. No. 2,312,967. William Hanford to E. I. du Pont de Nemours & Co.

Making Polyamides. No. 2,312,966. William Hanford to E. I. du Pont de Nemours & Co.

Producing chlorine by oxidation of hydrogen chloride. No. 2,312,952. Frederick Balcar to Air Reduction Co., Inc.

Method of producing bunsen's salt. No. 2,312,918. Urner Liddel and Robert Barnes to American Cyanamid Company.

Meta-hydroxyphenyl-ethanolamine and process of making the same. No. 2,312,916. Helmut Legerlotz to Ciba Pharmaceutical Products, Inc.

Polyamide coated film element. No. 2,312,913. James Kirby to E. I. du Pont de Nemours & Co.

Recovery of a high boiling selective solvent such as furfural from a mixture of oil and solvent. No. 2,312,912. Wynkoop Kiersted, Jr. to The Texas Co.

Method of bluing coal. No. 2,312,898. Garnet Ham and Robert Barnes to American Cyanamid Co.

Water-soluble, capillary active solid substance which is decomposed by boiling with hydrochloric acid. No. 2,312,896. Charles Graenacher, Richard Sallamann and Otto Albrecht to Society of Chemical Industry.

Fiber-forming polymers and method of making them. No. 2,312,879. Robert Christ to E. I. du Pont de Nemours & Co.

Alkali metal salt of beta-sulfopropionitrile. No. 2,312,878. Erwin Carpenter to American Cyanamid Co.

Derivatives of o-hydroxybenzenecarboxylic acids and process of manufacture. No. 2,312,864. Jakob Bindler to J. R. Geigy A. G.

Preparation of deoiled sludge in combination with acid recovery. No. 2,312,756. Robert Ferguson and Insley Jones to Standard Oil Development Co.

Manufacture of amino compounds. No. 2,312,754. Lee Davy to Eastman Kodak Co.

Blasting unit comprising water-tight and pressure-resistant container and a pelleted charge. No. 2,312,752. Melvin Cook to E. I. du Pont de Nemours & Co.

Preparing unsaturated ketones by the catalytic dehydration of keto-alcohols. No. 2,312,751. Charles Cohen to Standard Oil Development Co.

Sulfurized addition agent for lubricants and lubricants containing the same. No. 2,312,750. Charles Cohen to Jasco, Inc.

Alkoxy meta-dioxanes. No. 2,312,743. Erving Arundale and Louis Mikeska to Standard Oil Development Co.

Ignition composition for blasting initiators comprising a colloided nitrocellulose composition. No. 2,312,741. Clifford Woodbury to E. I. du Pont de Nemours & Co.

Making a carbon product. No. 2,312,707. Walter Fuchs to The Pennsylvania Research Corp.

Reaction product of aldehydes and diazine derivatives. No. 2,312,705. Gaetano D'Alelio to General Electric Co.

Reaction product of aldehydes and triazine derivatives. No. 2,312,704. Gaetano D'Alelio to General Electric Co.

Reaction product of aldehydes and diazine derivatives. No. 2,312,703. Gaetano D'Alelio to General Electric Co.

Reaction product of aldehydes and triazine derivatives. No. 2,312,702. Gaetano D'Alelio to General Electric Co.

Triazine derivatives. No. 2,312,701. Gaetano D'Alelio to General Electric Co.

Diazine derivatives. No. 2,312,700. Gaetano D'Alelio to General Electric Co.

Triazinyl carboxy-alkyl sulfides and salts thereof. No. 2,312,699. Gaetano D'Alelio and James Underwood to General Electric Co.

Sulfamylarylamino triazines. No. 2,312,698. Gaetano D'Alelio to General Electric Co.

Reaction product of aldehydes and sulfamylarylamino triazines. No. 2,312,697. Gaetano D'Alelio to General Electric Co.

Reaction product of aldehydes and triazine derivatives. No. 2,312,696. Gaetano D'Alelio to General Electric Co.

Diazine derivatives. No. 2,312,695. Gaetano D'Alelio to General Electric Co.

Triazine derivatives. No. 2,312,694. Gaetano D'Alelio to General Electric Co.

Reaction product of aldehydes and diazine derivatives. No. 2,312,693. Gaetano D'Alelio to General Electric Co.

Triazine derivatives. No. 2,312,692. Gaetano D'Alelio to General Electric Co.

Diazine derivatives. No. 2,312,691. Gaetano D'Alelio to General Electric Co.

Reaction product of aldehydes and triazine derivatives. No. 2,312,690. Gaetano D'Alelio to General Electric Co.

Reaction product of aldehydes and diazine derivatives. No. 2,312,689. Gaetano D'Alelio and James Underwood to General Electric Co.

Reaction product of aldehydes and triazine derivatives. No. 2,312,688. Gaetano D'Alelio to General Electric Co.

Terpene derivative. No. 2,312,685. Joseph Borglin to Hercules Powder Co.

Producing hydroxylated terpene ester. No. 2,312,684. Joseph Borglin to Hercules Powder Co.

Method of preparing bituminous paving mixtures. No. 2,312,674. Joseph Roediger to Standard Oil Development Co.

Treating catalysts containing black, unglowered chromium oxide reduced substantially with hydrogen. No. 2,312,572. Glen Morey and Frederick Frey to Phillips Petroleum Co.

Naphthoquinone oxides and method of preparing the same. No. 2,312,535. Louis Fieser to Research Corp.

A 2-alkyl-3-alkenyl-1,4-naphthoquinone-2,3-oxide. No. 2,312,504. Max Tishler to Research Corp.

Production of succinic acid. No. 2,312,468. Friedrich Ebel and Friedrich Pyzik.

Preparing a carbonaceous cationic exchange material. No. 2,312,449. Milton Shoemaker to Research Products Corp.

Preparing composition suitable as binder in a dry-process molded friction element. No. 2,312,431. Virgil Meharg and Arthur Maxzucchelli to Bakelite Corp.

Manufacture of metal fluosulfonates. No. 2,312,413. Ralph Iler to E. I. du Pont de Nemours & Co.

Preparing n-sulfonyl ureas. No. 2,312,404. Erich Haack.

Acylated P-aminobenzyl amines and their quaternary derivatives. No. 2,312,395. Kurt Engel and Kurt Pfaehler to J. R. Geigy A. G.

Preparing abrasive article of soft-bond type from granules having as a bond a phenolic resin. No. 2,312,392. Rupert Daniels to Bakelite Corp.

Mixing hydrocarbons containing mercaptans with aqueous alkaline solution in order to remove mercaptans from hydrocarbons. No. 2,312,365. William Shiffler and Laverne Elliott to Standard Oil Company of Calif.

Synthetic mounting material for microscopic specimens. No. 2,312,329. William Fleming.

Reaction product of aldehydes and guanazo triazines. No. 2,312,321. Gaetano D'Alelio and James Underwood to General Electric Co.

Forming nitrocellulose lacquer film with a flat finish. No. 2,312,309. Charles Bogin and Herbert Wampner to Commercial Solvents Corp.

Polyester compounds and method of making same. No. 2,311,534. Anthony Gleason to Standard Oil Development Co.

Catalytic alkylation process. No. 2,311,531. Stewart Fulton to Standard Oil Development Co.

Luting material comprising approximately 50% by weight of aluminum flake powder, approximately 39% by weight of a petroleum lubricating oil, approximately 10% by weight of an asphaltic binder, the remainder comprising small quantities of soap and rubber. No. 2,311,526. William Ferguson and Paul Sussenbach to The Presstite Engineering Co.

Process of preparing storage battery cases and the like. No. 2,311,424. Edward Dillehay to The Richardson Co.

Shrinkproofing process. No. 2,311,507. Paul Arthur, Jr. to E. I. du Pont de Nemours & Co.

Chlorination of metal bearing materials. No. 2,311,466. Alphonse Pechukas to Pittsburgh Plate Glass Co.

Chlorination of chromium bearing materials. No. 2,311,459. Irving Muskat to Pittsburgh Plate Glass Co.

Chlorination of chromium bearing materials. No. 2,311,458. Irving Muskat to Pittsburgh Plate Glass Co.

Preparation of chlorsulfonic acid. No. 2,311,619. Napoleon Laury to American Cyanamid Co.

Method of making polymers derived from styrene. No. 2,311,615. John Zemba and Gerald Coleman to The Dow Chemical Co.

Preparation of styrene copolymers. No. 2,311,607. Gerald Coleman and John Zemba to The Dow Chemical Co.

Plasticized polyamide. No. 2,311,587. Gordon Vaala to E. I. du Pont de Nemours & Co.

Process of carrying out polymerizations. No. 2,311,567. Michael Otto, Hermann Gueterbock and Alfred Hellemanns to Jasco, Inc.

Handling finely divided materials. No. 2,311,564. John Munday to Standard Oil Development Co.

Polymers of amides of alpha-methylene monocarboxylic acids. No. 2,311,548. Ralph Jacobson and Charles Mighton to E. I. du Pont de Nemours & Co.

Treatment of synthetic filament. No. 2,311,405. Maurice L. Macht and Malcolm M. Renfrew to E. I. du Pont de Nemours & Co.

Art of stabilizing tall-oil materials. No. 2,311,386. Torsten Hasselstrom to G. & A. Labs, Inc.

Conversion of hydrocarbons. No. 2,311,357. Harold V. Atwell to Process Management Co., Inc.

Sulfur removal from hydrocarbons. No. 2,311,342. Wm. J. Kerns and Clayton M. Beamer to Standard Oil Development Co.

Polymerization of diallyl esters and products thereof. No. 2,311,327 Theodore F. Bradley to American Cyanamid Co.

Manufacture of tin naphthenate. No. 2,311,310. Donald E. Bowers to Socony-Vacuum Oil Co., Inc.

Production of metal carbonyls. No. 2,311,307. Rudolf Staeger and Kurt Ehrmann to General Aniline & Film Corp.

Phosphonic acids. No. 2,311,306. Harold W. Ritchey to Union Oil Co. of California.

Preparation of guanyl ureas. No. 2,311,296. David W. Jayne, Jr. to American Cyanamid Co.
Preparation of biguanids. No. 2,311,295. David W. Jayne, Jr. to American Cyanamid Co.
Production of high concentrated fixing and hardening sirups. No. 2,311,293. Garnet Philip Ham to American Cyanamid Co.
Method increasing plasticity of Portland Cement mixtures. No. 2,311,-288 to 2,311,290. Robert Ben Booth to American Cyanamid Co.
Dinitro alkyl phenols and method of preparing same. No. 2,311,282. Richard O. Roblin, Jr. to American Cyanamid Co.
Nitrated bornyl phenols and method of preparing same. No. 2,311,-282. Richard O. Roblin, Jr. and Ingenuin Hechenbleikner to American Cyanamid Co.
Method preparing disubstituted cyanamides. No. 2,311,281. Richard O. Roblin, Jr. to Ingenuin Hechenbleikner to American Cyanamid Co.
Hydrocarbon conversion. No. 2,311,273. Kenneth M. Watson to Universal Oil Products Co.
Mercurated alkyl amides of dibasic phenylene acids and homologues thereof. No. 2,311,267. Donalee L. Tabern to Abbott Labs.
Esters of endo-methylene hexahydrophthalic acids with higher aliphatic alcohols. No. 2,311,261. Charles E. Staff to Carbide & Carbon Chemicals Corp.
Esters of endo-methylene hydrophthalic acids with glycol and polyglycol monoethers. No. 2,311,260. Charles E. Staff to Carbide & Carbon Chemicals Corp.
Manufacture of catalysts. No. 2,311,232. Vladimir Ipatieff and Herman Pines to Universal Oil Products Co.
Process of regeneration of an absorption liquid consisting of basic aluminum sulfate for recovery of sulfur dioxide. No. 2,311,202. Josef Barwasser and Wilhelm Thumm to American Lurgi Corp.
Purification of benzene. No. 2,311,189. Merlin D. Peterson to E. I. du Pont de Nemours & Co.
Tri-(Cyanoethyl)-Acetone. No. 2,311,183. Herman A. Bruson to The Resinous Products & Chem. Co.
Method for separation by distillation of mixture of organic compounds into fractions of predetermined purity. No. 2,311,180. Marcel J. P. Bogart and James S. F. Carter to The Lummus Co.
Process for agglomerating commercial carbon black. No. 2,311,154. Samuel C. Carney to Phillips Petroleum Co.
Manufacture of producer gas. No. 2,311,140. Friedrich and Joseph Daniels to Koppers Co.
Continuous recovery of pyridine. No. 2,311,134. John W. Schutt to Koppers Co.
Doubly unsaturated ketones and process of making same. No. 2,311,-102. Albert Wettstein to Ciba Pharmaceutical Products Inc.
Halogen substituted acylamino sulfonic acids. No. 2,311,062. Henry Martin, Hans H. Zaeslin, Rudolf Hirt and Alfred Staub to J. R. Geigy A. G.
Reduction of m-nitro acetoacetanilide which comprises subjecting its solution in dilute aqueous alkali containing a hydrogenation catalyst to the action of hydrogen under pressure. No. 2,311,054. William Kenyon and Wesley Lowe to Eastman Kodak Co.
Manufacture of aromatic isocyanates. No. 2,311,046. Richard Greenhalgh and Henry Piggott to Imperial Chemical Industries Ltd.
Chlorohydrin of unsaturated alcohol. No. 2,311,023. Benjamin Brooks to Standard Alcohol Co.
Process and composition for softening hard water. No. 2,311,008. Nathaniel Tucker to The Procter & Gamble Co.
Hydrolysis of fats and oils. No. 2,310,986. John Murphy to Lever Brothers Co.
Rubber and asphalt dispersion cement. No. 2,310,972. Harvey Livermore and Gordon Lindner and Henry Stephens to Minnesota Mining & Mfg. Co.
Copolymer of isopropenyl toluene and acrylonitrile and process of producing same. No. 2,310,961. Edward Kropa to American Cyanamid Co.
Polyvinyl acetals. No. 2,310,943. George Dorough and David McQueen to E. I. du Pont de Nemours & Co.

Metals, Alloys

Producing decorative patterns or designs of articles by forming a layer of cuprous oxide thereon. No. 2,313,456. Jesse Stareck to Kansas City Testing Laboratory.
Decoratively gold coloring articles by electrodepositing a layer of cuprous oxide approximately three-tenth to one millionth of an inch thick. No. 2,313,455. Jesse Stareck.
Electrodepositing cuprous oxide from bath containing in solution copper in the cupric state. No. 2,313,454. Jesse Stareck to Kansas City Testing Laboratory.
Continuously pickling base metal strip for tin plate and the like. No. 2,313,422. Richard Dimon to Carnegie-Illinois Steel Corp.
Ferrous alloy particularly adapted for hard facing purposes. No. 2,313,420. Arthur Cape to Coast Metals, Inc.
Preparation of boron compositions. No. 2,313,410. Henry Walther to Bell Telephone Laboratories, Inc.
Electrolyte for the deposition of lead. No. 2,313,372. James Stack, Alvilda Stack to Carnegie-Illinois Steel Corp.
Electrolyte for the deposition of tin, and tin-lead alloys. No. 2,313,-371. James Stack, Alvilda Stack to Carnegie-Illinois Steel Corp.
Separation of siliceous gangue from non-metalliferous ores. No. 2,313,360. Anderson Ralston and Ervin Segebrecht to Armour and Co.
Continuous electro-deposition of sponge zinc in a cell containing alternate insoluble positive electrodes and negative electrodes. No. 2,313,338. William Hannay and Basil Walsh to The Consolidated Mining & Smelting Co. of Canada Ltd.
In electric condenser, a solid dielectric, comprising mixed solid and liquid polymers of dihydronaphthalene. No. 2,313,093. Samuel Ruben.
Electric contacting element formed of a metal composition composed of 35 to 70% of refractory metal carbide. No. 2,313,070. Franz Hensel, Earl Larsen, and Earl Swazy to P. R. Mallory & Co., Inc.
Producing titanium free steel and a highly concentrated titanium slag from ores and sands containing ilmenite. No. 2,313,044. Herman Brassert to Minerals and Metals Corp.
Converting beryllium content of beryllium containing ores residues into alkali metal double fluoride compounds. No. 2,312,297. Henry C. Kawecki to Reconstruction Finance Corp.
Welding electrode consisting of copper and zinc and coating of carbon. No. 2,312,109. John R. McDonald and Hubert N. Ruel to Bethlehem Steel Co.
Acidic nickel plating bath. No. 2,312,097. Richard O. Hull and Clayton F. Ruebensaal to E. I. du Pont de Nemours & Co.
Process for making electrical conductors consisting of vanadium oxide and titanium oxide. No. 2,311,918. Eugene Wainer and Norman R. Thielke to The Titanium Alloy Mfg. Co.
Process for making electrical conductors consisting of chromium oxide and titanium oxide. No. 2,311,917. Eugene Wainer and Norman R. Thielke to The Titanium Alloy Mfg. Co.
Insulating and protecting molten metallic baths from oxidation by disposing a layer of slag wool upon the surface. No. 2,311,881. Henry H. Smith to The American Steel and Wire Co. of N. J.
Method of attaching high chromium ferrous alloys to other metals. No. 2,311,878. Robert W. Schlumpf to Hughes Tool Co.
Welding electrode composed of copper base alloy containing columbium and copper. No. 2,311,750. Franz B. Hansel and Earl I. Larsen to P. R. Mallory & Co., Inc.
Forming flux composition for use on bath of molten metal. No. 2,311,-669. Raymond J. Kepfer to E. I. du Pont de Nemours & Co.
Treating aluminum surface preparatory to applying an adherent coating. No. 2,311,623. Edward V. Blackmun and Michael P. Mikula to Aluminum Co. of America.
Composite three-ply steel having a center layer of mild steel and outer layers of high carbon steel. No. 2,312,582. Wilbur Patrick to Borg-Warner Corp.
Obtaining directly a soft ductile nickel plate of image reflective ability. No. 2,312,517. Edwin Baker to Houdaille-Hershey Corp.
Concentrating oxygen-bearing ore materials. No. 2,312,466. Stephen Erickson and David Jayne, Jr. to American Cyanamid Co.
Ore concentrating processes utilizing differential surface wettability principles of separating acidic silicious gangue from non-metallic ore constituents. No. 2,312,414. David Jayne, Jr., Stephen Erickson and Harold Day to American Cyanamid Co.
Froth flotation of acidic minerals. No. 2,312,387. Ludwig Christmann and David Jayne, Jr. and Stephen Erickson to American Cyanamid Co.
Osmium alloy. No. 2,312,324. Andrew Devereux to Goldsmith Bros. Smelting & Refining Co.
Bonding powdered metallic material to ferrous metal support. No. 22,282. Carl Swartz to S. K. Wellman Co.
Copper corrosion inhibitor. No. 2,311,505. Francis Archibald and Carl Harris to Standard Oil Development Co.
Electric contact member formed of alloy containing as an essential ingredient, silver, to which has been added iron in amounts ranging from 2.5 to 50%. No. 2,311,436. Childress B. Gwyn, Jr. to Fansteel Metallurgical Corp.
Electrolytic beryllium and process. No. 2,311,257. Charles B. Sawyer and Bengt Kjellgren to The Brush Beryllium Co.
Process treating copper. No. 2,311,083. Harvey S. Rader.
Electric furnace resistor having a low temperature coefficient of resistance comprising a platinum-ruthenium wire containing from 1 to 20% of ruthenium. No. 2,311,028. Jack Chambers.
Method of making wrought iron by the Aston process comprising admixing with molten slag molten refined ferrous material having a carbon content of at least about .03% and below .06% to form a wrought iron sponge ball. No. 2,311,002. Edward Story to A. M. Byers Co.
Purification of titanium carbide and similar materials. No. 2,310,964. Charles Laughlin to The Titanium Alloy Mfg. Co.
Reissue—Process for the manufacture of aluminum. No. 22,270. Hirsch Leovenstein to Independent Aluminum Corp.

Paper and Pulp

Bleaching wood at normal temperature with sodium peroxide and hydrogen peroxide. No. 2,312,218. Norman A. MacBean to Angus A. MacBean.
Reissue—Production of wood impregnant from high temperature coal tar fractions. No. 22,269. Jacquelin Harvey, Jr. to Southern Wood Preserving Co.

Petroleum

Isomerization and alkylation of paraffins. No. 2,313,661. Charles Montgomery to Gulf Research & Development Co.
Alkylating an iso-paraffin with an olefin in the presence of an alkylation catalyst. No. 2,313,660. Charles Montgomery to Gulf Research & Development Co.
Unemulsified asphalt composition capable of forming a durable bond with galvanized metal surfaces. No. 2,313,596. Stanley Sorem and Alvin Anderson to Shell Development Co.
Manufacturing aromatic hydrocarbons from a mixture of highly heated cracked products. No. 2,313,346. William Kaplan to Cities Service Oil Co.
Improving the road octane rating of a given body of gasoline. No. 2,313,117. Arman Becker to Standard Oil Development Co.
Alkylating an isoparaffin with an olefin in the presence of fluorosulfonic acid. No. 2,313,103. Charles Thomas to Universal Oil Products Co.
Conversion of hydrocarbons higher boiling than gasoline to hydrocarbons boiling within the gasoline range. No. 2,313,092. Francis Rice to Process Management Co., Inc.
Catalytic isomerization of saturated hydrocarbons. No. 2,313,054. Martin de Simo and Frank McMillan and Harry Cheney to Shell Development Co.
Catalytic conversion of high-boiling hydrocarbons into low-boiling hydrocarbons within the gasoline boiling range. No. 2,312,230. Arnold Belchetz to The M. W. Kellogg Co.

Additional patents on petroleum, resins, rubber and textiles from the above volumes will be given next month.

Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those making use of this summary should keep in mind the following facts:

Belgian and Canadian patents are not printed. Photostats of the former and certified typewritten copies of the latter may be obtained from the respective Patent Offices.

English *Complete Specifications Accepted* and French patents are printed, and copies may be obtained from the respective Patent Offices.

In spite of present conditions, copies of all patents reported are obtainable, and will be supplied at reasonable cost.

This digest presents the latest available data, but reflects the usual delays in transportation and printing. Your comments and criticisms will be appreciated.

CANADIAN PATENTS

Granted and Published December 1, 1942.

Wire fabric comprising warp wires and weft wires, said wires comprising an aluminum alloy core having a coating of a different aluminum base alloy, the coating on the warp wires being a different hardness than the coating of the weft wires. No. 408,951. Aluminum Company of America. (William T. Ennor).

A floor covering composition containing a siccative binder including a material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polybasic acid resins and a substance selected from the group consisting of cyanamide, dicyandiamide, melamine and the methylol derivatise thereof. No. 408,953. American Cyanamid Company. (Walter W. Durant).

Surface covering composition including a siccative material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polybasic acid resins and di-hydrocarbon-substituted cyanamide containing not more than 14 carbon atoms in the substituent groups. No. 408,954. American Cyanamid Company. (Richard O. Roblin, Jr.).

Surface covering composition containing a siccative binder including a material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polybasic acid resins and a water-insoluble metal cyanamide which is substantially stable in the presence of water. No. 408,955. American Cyanamid Company. (Coleman R. Caryl).

Pest control agent including a compound having the formula

$$\begin{array}{ccc} R^1 & & R^3 \\ | & & | \\ C & = & C\text{–}CN \\ | & & \\ R^2 & & \end{array}$$

in which R^1, R^2 and R^3 represent hydrogen, an aliphatic hydrocarbon radical or a halogen substituted aliphatic hydrocarbon radical. No. 408,956. American Cyanamid Company. (Vartkes Migrdichian).

Production of ethylene and aromatic hydrocarbons by cracking normally liquid hydrocarbon oil vapor derived from petroleum. No. 408,976. Canadian Industries Ltd. (Crawford H. Greenewalt).

Polymeric reaction product of compounds consisting of equimolecular proportions of bifunctional polyamide-forming reactants the sum of whose radical lengths is at least 9, the amide-forming groups in said reactants being attached to aliphatic carbon atoms, at least one of said reactants containing an unsaturated carbon-carbon linkage of the non-benzenoid type in the chain separating the amide-forming group. No. 408,978. Canadian Industries Limited. (Wallace H. Carothers).

Preparing surface active substances which comprises reacting a-a' dialkyl glycerine ethers having not more than 25 carbon atoms in the molecule with a sulfating agent at a low temperature until sulfation in the beta position is at least partially complete. No. 408,979. Canadian Industries Limited. (Norman D. Scott).

Partially hydrolyzing polymerized vinyl acetate by reacting the same with methanol in an anhydrous reaction medium containing an alkaline hydrolysis catalyst and methyl acetate, the ratio of methyl acetate to methanol in the initial reaction mixture being from about 0.3:1 to about 6:1 parts by weight, and separating the partially hydrolyzed product from the reaction medium before the hydrolysis reaction has gone to completion. No. 408,980. Canadian Industries Limited. (Norman D. Scott and John E. Bristol).

Preparation of a di-primary diamino alkane which comprises catalytically hydrogenating a dicyanoalkane having from 3 to 20 carbon atoms in the presence of a highly selectively primary amine-forming cobalt hydrogenation catalyst at a temperature between 50 and 170°C. No. 408,981. Canadian Industries Limited. (Frank K. Signaigo).

Preparing an N-(alpha-isoalkylidene)-aminophenol which comprises condensing 1 mole of an alpha-isoalkyl aldehyde with 1 mole of a primary aminophenol in a solvent at temperatures below 125°C. No. 408,982. Canadian Industries Limited. (Richard G. Clarkson).

Catalytically hydrogenating an aliphatic dinitrile having from 6 to 10 carbon atoms in presence of a cobalt hydrogenation catalyst at a temperature between 50 and 170°C. No. 408,983. Canadian Industries Limited. (Benjamin W. Howk).

Preparing an acetylenic acid by preparing an alkali metal acetylide homolog in liquid ammonia, mixing with the mixture of liquid ammonia and said homolog a dry, liquid, inert hydrocarbon, evaporating the ammonia from said mixture to produce a mixture of said acetylide homolog and said hydrocarbon and thereafter reacting the resulting mixture with carbon dioxide. No. 408,984. Canadian Industries Limited. (Alexander D. Macallum).

Method of vulcanizing rubber which comprises incorporating into a rubber mix, prior to vulcanization, a small amount of the zinc salt of 2-mercapto-thiazoline. No. 408,986. Canadian Industries Limited. (Ira Williams and Bernard M. Sturgis).

Preparation of N-alkyl-aminophenols by a method including the steps comprising condensing 1 mole of an unsubstituted aliphatic aldehyde with 1 mole of a primary aminophenol and dehydrogenating the condensation product so formed as fast as it is formed. No. 408,987. Canadian Industries Limited. (Howard M. Fitch).

N-(alpha-beta-alkenylidene)-p-aminophenol of the benzene series in which the alkenylidene radical contains from 3 to 4 carbon atoms. No. 408,988. Canadian Industries Limited. (Howard M. Fitch).

Metal salt of a 2-mercapto-thiazoline in which the metal is a member of the group consisting of zinc, cadmium and lead, and in which each organic group attached to the metal is a 2-mercapto-thiazole group. No. 408,989. Canadian Industries Limited. (Ira Williams and Bernard M. Sturgis).

Explosive charge enclosed in a cartridge comprising a self-supporting flexible clay-containing film. No. 408,992. Canadian Industries Limited. (Norman G. Johnson).

Making sulfamic acid by reacting in an aqueous medium sulfur dioxide under pressure of about 20 to 50 pounds per square inch gauge with a hydroxylamine-yielding compound in proportions such that sulfamic acid is formed in excess of its solubility in the reaction mixture. No. 408,993. Canadian Industries Limited. (Martin E. Cupery).

Process for coating a ferrous base with an alloy of sodium and a fusible metal which has a melting point lower than that of said base. No. 408,994. Canadian Industries Limited. (Harvey N. Gilbert).

Moistureproof film comprising essentially: n-butyl methacrylate polymer 25% nitrocellulose (11.5% N) 25%, paraffin wax (M.P.60°C) 3%, dibutyl phthalate 10%, ester gum 37%. No. 408,996. Canadian Industries Limited. (James A. Mitchell).

Alloy-skeleton cobalt catalyst, easily suspensible, obtained by extracting substantially all of the alkali soluble metallic component from a finely ground alloy of cobalt and an alkali soluble metal, said alloy containing 25 to 35% by weight of cobalt. No. 408,998. Canadian Industries Limited. (Benjamin W. Howk).

Machine bearing comprising a solid polymer having a continuous carbon to carbon chain and which softens at temperatures above 90°C. No. 408,999. Canadian Industries Limted. (Lucius Gilman).

Unsaturated imines having the formula:

$$\begin{array}{l} R\text{-}CH\text{-}CH{=}N\text{-}CH{=}C\text{-}R \\ \quad\;\;\, | \qquad\qquad\qquad\;\; | \\ \quad\;\;\, R' \qquad\qquad\quad\;\;\, R' \end{array}$$

wherein R is an alkyl group having more than one carbon atom and R' is an alkyl group having from 1 to 4 carbon atoms. No. 409,004. Carbide and Carbon Chemicals Limited. (Jared W. Clark and Alexander L. Wilson).

Activating a silver catalyst by treating it with the vapors of one of the group consisting of halogens and halogen-containing organic substances, and thereafter bringing the halogen treated catalyst in contact with water vapor and the vapor of an olefine oxide. No. 409,005. Carbide and Carbon Chemicals Limited. (Raymond W. McNamee, George H. Law and Henry C. Chitwood).

Ore roasting process involving the production and purification of sulfur dioxide. No. 409,018. General Chemical Company. (Urban S. Lauber).

Process for recovering sulfuric acid from residual sulfuric acid liquor resulting from hydrolytic precipitation of metatitanic acid. No. 409,019. General Chemical Company. (L'Roche G. Bousquet and Maxwell J. Brooks).

Refrigerating apparatus for carcasses of slaughtered animals. No. 409,026. Industrial Patents Corporation. (Frank B. Bratek and Harry H. McKee).

Method of treating edible animal carcasses by chilling. No. 409,027. Industrial Patents Corporation. (Frank B. Bratek and Andrew S. Hartanov).

Method of treating edible animal carcasses by chilling. No. 409,028. Industrial Patents Corporation. (Andrew S. Hartanov and Frank B. Bratek).

Process of dehydrogenating partially halogenated aliphatic hydrocarbons containing 3 to 5 carbon atoms in the molecule. No. 409,032. Jasco Incorporated. (Hans Baehr and Wilhelm Deiters).

Interleaf material for laminated glass comprising polyvinyl acetal resin plasticized with a mixed molecule ester of a polyhydric alcohol and at least two different acids. No. 409,038. Monsanto Chemical Company. (John M. DeBell and Elmer R. Derby).

Refining fat-soluble vitamin-containing oils by subjecting them to treatment with activated carbon before the removal of all of the free fatty acids present therein. No. 409,040. National Oil Products Co. (Loran O. Buxton and Eric J. Simmons).

Removing objectionable tastes and odors from fat-soluble vitamin-containing materials by heating said materials with a sugar at a temperature between about 100° and about 200°C. No. 409,041. National Oil Products Co. (Loran O. Buxton).

Method of producing a set magnesium carbonate composition. No. 409,044. Plant Rubber & Asbestos Works. (Samuel A. Abrahams and Rubin Lewon).
Method of producing a set magnesium carbonate composition. No. 409,045. Plant Rubber & Asbestos Works. (Samuel A. Abrahams and Rubin Lewon).
Method of producing a self-set magnesium carbonate composition. No. 409,046. Plant Rubber & Asbestos Works. (Samuel A. Abrahams and Rubin Lewon).
Method of setting magnesium carbonate composition. No. 409,047. Plant Rubber & Asbestos Works. (Samuel A. Abrahams and Rubin Lewon).
Method of producing synthetic stone by mixing finely divided anhydrous alumino-silicate material, alumino-silicic acid material, an alkaline-earth base, and sufficient water for thorough wetting, until a compact thoroughly wetted mass is produced in which there is intimate particle contact, forming the mass into a desired shape, and indurating the shape by subjecting it to moist heat to produce chemical reaction. No. 409,055. Rostone Corporation. (Paul W. Jones and John W. Swezey).
Catalyst for catalytically reforming which comprises peptized alumina gel and another metal oxide. No. 409,056. Standard Oil Development Company. (Gerald C. Connolly).
Method of dewaxing hydrocarbon oil. No. 409,061. Texaco Development Corporation. (Howard H. Gross and Walter Smisloff).
Continuous method of dewaxing wax-bearing oils. No. 409,062. Texaco Development Corporation. (William P. Gee).
Method of conditioning a drilling mud to control the viscosity and other properities thereof. No. 409,063. Texaco Development Corporation. (Allen D. Garrison and Karl C. ten Brink).
Method of treating a water-wet producing sand of an oil well to improve the production of oil relative to the production of water from the well. No. 409,064. Texaco Development Corporation. (Allen D. Garrison).
Polymerization of an olefinic mixture containing isobutene and propene in the presence of solid phosphoric acid catalyst. No. 409,070. Universal Oil Products Company. (Vladimir Ipatieff and Raymond E. Schaad).
Production of filaments of organic esters of cellulose by melting the ester under pressure applied directly thereto by a hot aqueous liquid, extruding the molten organic ester of cellulose under such pressure through orifices to form filaments, and setting said formed filaments. No. 409,075. Camille Dreyfus. (George Schneider).
Surgical ligature in the form of a ribbon of absorbable animal material from 0.8 to 2.0 centimeters in width, in usable lengths and in thickness no more than that of fine rice paper. No. 409,079. Davis & Geck, Inc. (William P. Didusch).

Granted and Published December 8, 1942.

Method of waving hair wherein the hair is subjected to heat sufficient to impart a permanent wave thereto, which said heat is generated by an electron transfer in the presence of a stabilizing material to prevent premature reactions. No. 409,086. Gladys Graham Barnett.
Impregnated textile material having developed within the fibre so much of an insoluble colored complex containing a coloring matter and the product of the reaction between an amphoteric protein and a compound containing an amphoteric metal, that the material is colored and rendered waterproof but substantially retains the remaining initial qualities of the material as such. No. 409,119. Eric Berkeley Higgins.
Producing gasoline from crude oil and flare gas by distilling the gasoline fraction from a still charged with crude and introducing to the still a further quantity of crude treated with picric acid and a quantity of flare gas below the liquid level in the still during the distillation process. No. 409,126. Allied Syndicate Limited. (Ernest C. Whitelaw).
Curing a surface covering composition including a siccative material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polycarboxylic acid resins, by adding to such composiition a guanide. No. 409,127. American Cyanamid Company. (Walter W. Durant).
Curing a surface covering composition including a siccative material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polycarboxylic acid resins, by adding thereto a guanidine salt. No. 409,128. American Cyanamid Company. (Walter W. Durant).
Curing a surface covering composition including a siccative material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polycarboxylic acid resins, by adding thereto a guanamide. No. 409,129. American Cyanamid Company. (Walter W. Durant).
Process of curing a surface covering composition including a siccative material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polycarboxylic acid resins comprising adding thereto a salt of guanyl urea. No. 409,130. American Cyanamid Company. (Walter W. Durant).
Curing a surface covering composition including a siccative material selected from the group consisting of drying oils and drying oil modified polyhydric alcohol-polycarbonylic acid resins, by adding thereto an unsaturate nitrile. No. 409,131. American Cyanamid Company. (Walter W. Durant).
Recovery of molybdenite by froth flotation by subjecting an aqueous pulp containing molybdenite to a froth flotation operation in the presence of a frother composition comprising a mixture of higher aliphatic alcohols and hydrocarbons of the paraffin and terpene series. No. 409,132. American Cyanamid Company. (Corbin Marsh).
Briquetting coking coals by finely grinding the coal, mixture with a binder composition comprising a mixture of sulfuric acid and a substance included in the group consisting of coal tar, coal pitches, and mixtures of coal tar and coal pitches, compressing into briquettes and carbonizing. No. 409,133. American Cyanamid Company. (Clayton S. Wolf).
Sunburn preventing composition comprising a vehicle having dispersed therein a small quantity of a resin capable of absorbing light of wave lengths normally tending to produce sunburn. No. 409,135. The Atlantic Refining Company. (Arthur B. Hersberger and Henry C. Cowles, Jr.).
Casting resin produced by reacting phenol, formaldehyde, and a relatively small amount of a mixture of glycine and sodium glycinate. No. 409,156. Canadian General Electric Company Limited. (Gaetano F. D'Alelio).
Process comprising reacting diketene with a benzene in the presence of aluminum chloride. No. 409,189. Carbide and Carbon Chemicals Limited. (Albert B. Boese, Jr.).
Vitamin containing emulsion. No. 409,207. General Mills, Inc. (Charles G. Ferrari).
Method of printing comprising producing an ink composition comprising a reactive dye in a fluid vehicle, providing a paper formed of cellulosic material and having incorporated therein a lake forming substance capable of relatively rapid reactive setting with the dye in the ink to form an insoluble dye compound, and applying the ink to the paper by a printing operation to cause immediate reactive setting of the ink. No. 409,211. General Printing Ink Corporation. (Walter S. Guthmann and Charles A. Pollak).
Apparatus for making granulated salt. No. 409,215. Goderich Salt Company Limited. (Clinton S. Robison).
Production of alpha-naphthyl acetic acid, its esters and salts by causing dichlormethyl ether to react with naphthalene in the presence of an acid condensing agent at a temperature of substantially 100°C to form alpha-chlormethyl naphthalene. No. 409,218. The Honorary Advisory Council for Scientific and Industrial Research. (Adrien Cambron).
Activating catalysts capable of promoting hydrogenating reactions or regenerating such catalysts so as to restore their hydrogenating ability. No. 409,219. Houdry Process Corporation. (Eugene J. Houdry).
Resin produced by reacting furfuryl alcohol and a substance selected from the group consisting of lignin-sulfonic acids and salts thereof. No. 409,226. Marathon Paper Mills Company. (John G. Meiler).
Anchoring thermoplastic coatings upon a sheet of vegetable parchment by coating the sheet material by a bonding substance consisting essentially of rosin size and anchoring to said bonding material a thermoplastic coating composition comprising essentially wax and rubber miscible with said bonding material and compatible therewith. No. 409,227. Marathon Paper Mills Company. (Allen Abrams, George W. Forcey, George J. Brabender and Winfred H. Graebner).
Apparatus for deaerating liquids. No. 409,232. D. Napier & Son Limited. (Harold W. J. Pope).
Manufacture of light-sensitive diazotype material. No. 409,241. Philips Lamps Limited. (Roelof J. H. Alink).
Apparatus for batch-feeding glass. No. 409,242. Pittsburgh Plate Glass Company. (Joseph H. Redshaw).
Method of treating granular glass-making material in a molten glass bath. No. 409,243. Pittsburgh Plate Glass Company. (Howard L. Halbach, Walter G. Koupal and William Owen).
Method of progressively producing binder-containing waterlaid felt. No. 409,247. Reconstruction Finance Corporation. (Milton O. Schur).
Process of producing a capillary-active sodium alkyl sulfate. No. 409,249. Shell Development Company. (Willem J. Dominiscus van Dijck and Johann A. Sandmann).
Limpid normally liquid oil composition comprising hydrocarbon oil containing paraffin wax in amount sufficient to impart an undesirable high cloud point to said oil in absence of a wax suppressor, and dissolved therein a quantity less than 0.1% of a mixture of albino asphalt together with a natural, at least partly saponifiable wax, said quantity being sufficient to suppress the separation of paraffin wax above the pour point of the hydrocarbon oil. No. 409,250. Shell Development Corporation. (Rene J. Narberes and Frank Derbenwick).
Composition for use in bake goods comprising a malt product and a soy bean material in proportion of about three to one. No. 409,252. Standard Brands, Incorporated. (Alfred S. Schultz and Charles N. Frey).
Process of regeneration of spent metal catalysts containing the sulfide of the metal. No. 409,268. Universal Oil Products Company. (Bryan D. Wells).
Process for the manufacture of acetic acid from alkali metal acetates. No. 409,277. Henry Dreyfus. (Henry Dreyfus and Walter H. Groombridge).
Process for the manufacture of acetic acid from alkali metal acetates. No. 409,278. Henry Dreyfus. (Henry Dreyfus and Walter H. Groombridge).

Granted and Published December 15, 1942.

Apparatus for spraying printed sheet material prior to superposition thereover of other printed sheet material. No. 409,289. Herbert Cole.
Dry glue comprising as its major adhesive constituent fertilizer blood, a lesser amount of water soluble blood albumen effective to impart high water resistance and from which the fertilizer blood a bond, and an alkali in amount effective to soften and swell the fertilizer blood and disperse the souble blood albumen when the same are wetted with water. No. 409,308. Adhesive Products Company. (William D. Fawthrop).
Process for continuously casting ingots. No. 409,313. Aluminum Company of America. (George E. Nighthart, Rufus P. Carter and Thaddeus J. Werner).
Gypsum plaster stabilized as to its setting time against adventitious accelerating and retarding influences. No. 409,326. Canadian Gypsum Company Limited. (George L. Hann).
Producing 1,1'-dithio-bis-arylene-thiozole by reacting at an elevated temperature upon an aqueous suspension of a 1-mercapto-arylene-thiozole with chromic acid. No. 409,332. Dominion Rubber Company Limited. (William E. Messer).
Making a lacquer coated vulcanized rubber product by coating the rubber with lacquer and conjointly making the lacquer and vulcanized rubber, and counteracting the lacquer retardation of the rubber cure by incorporating rubber vulcanization materials including substantial quantities of sulfur and rubber vulcanization accelerator in the lacquer before coating. No. 409,333. Dominion Rubber Company Limited. (Paul L. Bush and Dale E. Lovell).

NOROT
400,917

Metl-seal
400,923

SPEEDI-OUT
401,098

DK-50
445,390

DK-60
445,391

IMPERIAL BRAND
447,307

LEWISOL
447,308

450,836

UNITED STATES STEEL EXPORT COMPANY
USS
451,426

HICO
452,426

LAMEPON
453,615

LABORATORY-CONTROLLED THROUGHOUT PRODUCTION
EMERY INDUSTRIES INC.
454,600

"MINUS 625"
454,774

DRI-TRI
455,512

455,562

OSTOFORTE
455,653

DRAX
456,559

COMPREGNITE
456,621

MARVEL-KOTE
456,967

VIPOL
457,194

SOVA SUDS
457,645

PHIL KARB
CARBON BLACK
457,746

KOOLEX
CARBON BLACK
457,747

PHIL LEX
CARBON BLACK
457,748

NEO-BETA
457,763

Thirsty-Sak
457,777

WRINLIN
457,837

CALCI-DELTA
458,015

ANOZINC
458,025

TP
458,035

SUMGUM
458,055

RUBA
458,213

MERSOPOL
458,256

CELAFLUFF
458,324

CELAIRE
458,325

458,370

CAMOU-CURE
458,409

ALUCO
458,423

RHOMASE
458,431

CELAIRESE
458,626

DERGON
458,674

CARBONOX
458,704

BROMOSOLV
458,730

Rayflex
458,742

458,935

Trade Mark Descriptions†

400,917. Warwick Chemical Co., West Warwick, R. I.; Feb. 25, 1942; Serial No. 451,217; for chemicals for finishing textile fabric; since Feb. 15, 1942.

400,923. Defender Photo Supply Co., Inc., Rochester, N. Y.; Aug. 6, 1942; Serial No. 454,755; for photographic developing chemical; since Dec. 29, 1940.

401,098. Refiners Lubricating Co., Inc., New York, N. Y. to Refiners Lubricating Co., New York, N. Y.; Apr. 11, 1943; Serial No. 452,294; for chemical compound used as a fire preventive and fire extinguishing preparation; since Feb. 26, 1942.

445,390-445,391. Eastman Kodak Co. Rochester, N. Y.; July 16, 1941; for photographic chemicals; since Aug. 13 and Aug. 20, 1934 respectively.

447,307-447,308. Hercules Powder Co., Wilmington, Del.; Sept. 25, 1941; for synthetic resins; since Oct. 1, 1931.

450,836. Enrique Lemos, Buenos Aires, Argentina; Feb. 7, 1942; for vaccines, serums, and ferments; since February, 1927.

451,426. United States Steel Export Co., New York, N. Y.; Mar. 5, 1942; for sulfate of iron and other chemicals; since Jan. 22, 1942.

452,426. Claude M. Hathaway, as Hathaway Instrument Co., Denver, Col.; Apr. 18, 1942; for scientific instruments; since Mar. 24, 1942.

453,615. Chemical Marketing Co., Inc., New York, N. Y.; June 12, 1942; for wetting agent, emulsifier, fatty albumin acid, and animal protein extraction product; since Jan. 18, 1940.

454,600. Emery Industries, Inc. Cincinnati, Ohio; July 30, 1942; for textile oils and textile oil bases, scouring oils and scouring oil bases; since May 15, 1941.

454,774. American Colloid Co., Chicago, Ill.; Aug. 7, 1942; for clays—namely, bentonite; since July 17, 1942.

455,512. A. R. Maas Chemical Co., South Gate, Calif.; Sept. 14, 1942; for anhydrous trisodium phosphate; since Apr. 9, 1942.

455,562. Diamond Alkali Co., Pittsburgh, Pa.; Sept. 16, 1942; for cleaning and washing compounds; since 1912.

455,653. Charles E. Frosst & Co., Montreal, Quebec, Canada, and Richmond, Va.; Sept. 21, 1942; for medicinal products; containing sterols subjected to the controlled rays of ultra-violet light; since Dec. 28, 1940.

456,559. S. C. Johnson & Son, Inc., Racine, Wis.; Oct. 31, 1942; for aqueous and non-aqueous wax emulsions; since Sept. 16, 1942.

456,621. The Borden Company, New York, N. Y.; Nov. 3, 1942; for liquid phenol-formaldehyde resin solution; since Apr. 16, 1942.

456,967. Battenfeld Grease & Oil Corp., Kansas City, Mo.; Nov. 23, 1942; for concrete curing compound; since Sept. 25, 1942.

457,194. Viking Chemical Corp., New York, N. Y.; Dec. 3, 1942; for synthetic rubber compound in the form of a solid or spongy mass.; since Oct. 28, 1942.

457,645. Socony-Vacuum Oil Co., Inc., New York, N. Y.; Dec. 29, 1942; for water soluble fluid composition of soapless lathering material; since Nov. 12, 1942.

457,746-457,748. Phillips Petroleum Co., Bartlesville, Okla.; Jan. 4, 1943; for carbon black used as a filler in rubber or synthetic rubber; since Dec. 12, 1942.

457,763. Liberty Vitamin Corp., New York, N. Y.; Jan. 5, 1943; for vitamin B complex in form of tablets, syrup drops, and capsules; since Dec. 21, 1942.

457,777. Puritan Chemical Co., Atlanta, Ga.; Jan. 6, 1943; for device containing chemicals for use in absorbing moisture and as a deodorizer; since Dec. 1, 1942.

457,837. New Wrinkle, Inc., Dayton, Ohio; Jan. 9, 1943; for paints, enamels, and varnishes; since June, 1942.

458,015. Lederle Laboratories, Inc., New York, N. Y.; Jan. 19, 1943; for pharmaceutical preparation containing dicalcium phosphate and vitamin D; since Dec. 8, 1942.

458,025. United Chromium, Inc., New York, N. Y.; Jan. 19, 1943; for chemical compounds and compositions for use in anodizing metals; since Dec. 29, 1942.

458,035. Fisher Scientific Co., Pittsburgh, Pa.; Jan. 20, 1943; for laboratory reagent chemicals; since June 1, 1940.

458,055. R. T. Vanderbilt Co., Inc., New York, N. Y.; Jan. 20, 1943; for resin for use in the rubber industry; since Jan. 7, 1943.

458,213. Synthetix Latex Corp., New York, N. Y.; Jan. 28, 1943; for synthetic rubber; since Sept. 1, 1942.

458,256. Union-Baystate Co., Inc., Cambridge, Mass.; Jan. 30, 1943; for synthetic rubber; since Jan. 22, 1943.

458,324. Celanese Corporation of America; New York, N. Y.; Feb. 4, 1943. for staple fibers made wholly or partially of cellulose derivatives; since Jan. 27, 1943.

458,325. Celanese Corporation of America, New York, N. Y.; Feb. 4, 1943; for staple fibers; since Jan. 27, 1943.

458,370. Miller Manufacturing Co., Camden, N. J.; Feb. 6, 1943; for chemicals for repairing cracks in metals; since Jan. 21, 1943.

458,409. Ashton B. Rood, Los Angeles, Calif.; Feb. 8, 1943; for chemical preparation used as during treatment for new concrete; since Dec. 4, 1942.

458,423. Atlantic Chemicals & Metals Co., Chicago, Ill.; Feb. 9, 1943; for chemical flux for degasifying and purifying aluminum; since September, 1940.

458,431. Rohm & Haas Co., Philadelphia, Pa.; Feb. 9, 1943; for enzyme preparation; since Jan. 22, 1943.

458,626. Celanese Corporation of America, New York, N. Y.; Feb. 19, 1943; for staple fibers; since Feb. 15, 1943.

458,674. Arkansas Company, Inc., Newark, N. J.; Feb. 22, 1943; for detergents; since March, 1940.

458,704. W. P. Fuller & Co., San Francisco, Calif.; Feb. 23, 1943; for metal paints, since Jan. 1, 1931.

458,730. Givaudan-Delawanna, Inc., Delawanna, N. J.; Feb. 24, 1943; for solvents for use in preparation of cosmetics; since Feb. 17, 1943.

458,742. Raybestos-Manhattan, Inc., Stratford, Conn.; Feb. 22, 1943; for plasticizer, since Jan. 6, 1943.

458,935. Diamond Alkali Co., Pittsburgh, Pa.; Mar. 6, 1943; for laundry sours; since 1912.

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From Anhydrous HF